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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

JAMES W. WHITE, M.D., D.D.S.

Observe, Compare, Reflect, Record.

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LIST OF CONTRIBUTORS

TO

VOLUME XIX.

Barker, George T., M.D., D.D.S.	Philadelphia, Pa.
Chappell, M. H.	Knightstown, Ind.
Essig, Chas. J., M.D., D.D.S.	Philadelphia, Pa.
Farrar, J. N., M.D., D.D.S.	Brooklyn, N. Y.
Flagg, J. Foster, D.D.S.	Philadelphia, Pa.
Foster, E. W., M.D.	Boston, Mass.
Kingsley, Norman W.	New York, N. Y.
Mills, Geo. A.	Baltimore, Md.
Peirce, C. N., D.D.S.	Philadelphia, Pa.
Rehwinkel, F. H., M.D., D.D.S.	Chillicothe, O.
Thompson, A. H., D.D.S.	Topeka, Kansas.
Truman, James, D.D.S.	Hanover, Germany.
Webb, Marshall H., D.D.S.	Lancaster, Pa.
White, Samuel S., D.D.S.	Philadelphia, Pa.
Woodward, J. A., D.D.S.	Philadelphia, Pa.

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Davis, Brooke, D.D.S 490
Demarest, Dr. James H 365
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THE

DENTAL COSMOS.

VOL. XIX. PHILADELPHIA, JANUARY, 1877. No. 1.

ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S.,
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(Continued from page 622, vol. xviii.)

(*h*) *Loss of tooth-substance by attrition.*—Having referred to the exceeding tenderness which pertains to this condition of worn teeth when sensitive dentine is its result, I desire to notice the distinctive characteristics which are found in connection with pulp-irritation from this cause.

A review of the symptoms of odontalgia from sensitive dentine, and a comparison of them with the symptoms of pulp-irritation, will give the general basal means of making a correct diagnosis in any case of pain resulting from either of these causes. But it may be well at this time to direct attention to the facts that in sensitive dentine the point or points of extreme tenderness are almost always *not* directly over the extremity or horns of the pulp of the tooth giving trouble, but rather on some indiscriminate portion of the worn surface, and generally more on one edge than in the central part of the abrasion; when pain arises from an irritated pulp, the most tender spot is *invariably directly over* that portion or those portions of pulp most nearly exposed; and it is oftentimes remarkable to what degree of attenuation the dentine may be brought at these places before giving sufficiently serious inconvenience to demand relief.

It is frequently found just at one needle-point portion as thin as tissue-paper, and an ignorance of this will sometimes result in a complete exposure and wounded pulp from a mere probe examination.

It is therefore better to make the touch exploration with a small burnisher rather than with a sharp instrument; the response will be found quite as accurate, and the danger of undesirable complications will be materially diminished. Indeed, an instrument larger in bulk of metal than probes will afford not only the diagnosis of touch, but will add the thermal test as well. The immediate cessation of pain upon the removal of the blunt, cold, or warm instrument will indicate thus much toward sensitive dentine; while the continuance of pain, with more or less severity, for a longer or shorter period of time after the removal of the instrument, will point not alone to the existence of pulp-irritation, but will also give some idea of its degree and the grade of treatment required for its amelioration.

The character of the pain arising from the *irritation of pulp* from loss of tooth-substance by attrition is quite distinctive.

While that from sensitive dentine is *diffused* about the teeth, up into the cheek, and through the eye, with a general sense of uneasiness, long continuing (through weeks, months, and even years), not aggregating rapidly, responding almost always at least once to touch, and *never* aching with severe paroxysmal toothache of from ten to thirty minutes' duration, *the ache from the pulp* is much more decidedly localized, almost always, even to the offending tooth; it makes its appearance quite suddenly, aggregates in intensity from week to week, sometimes from day to day, and soon begins to take spells of a paroxysmal nature, which ere long develop pronounced paroxysms. Hot and cold applications promptly induce toothache, while *cool* water will be found to afford relief to irritation from hot soup, tea, or coffee, and *tepid* water will equally soothe the pain from ice-water, ice-cream, or other cold irritants.

I desire again to impress the *possible* cessation of response on the part of sensitive dentine after only one touch, and the *probable* continuation of response on the part of an almost exposed pulp after any number of touches. This is by no means a universal result, but it occurs with sufficient frequency to warrant a call of particular attention to it.

Having diagnosed an irritation of pulp which may yet possibly be found without the limits of so serious a lesion as complicated caries, I deem it a matter of sufficient importance to permit a short digression prior to the final consideration of this subject in its demands for devitalization.

It is in just such cases as these that I have been frequently consulted as to the possibility of devising means for relief without incurring the great expense which has been declared inevitable in connection with the capping of the irritated pulp, the building up of that tooth, and the necessary building up of sundry other teeth (oftentimes many), to insure that articulation essential to comfort and mastication. So far from its being usually needful, *or even advisable*, to perform these tedious, trying, and expensive operations, my experience for the past twenty years has been that the cutting away of the tooth which antagonizes and abrades the tooth giving pain, together with the judicious selection of three or four not unduly-worn, articulating teeth, for the purpose of making shallow cavities and introducing ordinary crown or surface fillings that further abrasion may be precluded, or at least greatly retarded, has comfortably, economically, and satisfactorily superseded the asserted necessity for proposed operations of tremendous magnitude.

It is easy to recognize the effect upon patients which such experiences are likely to produce, and it is also self-evident that such practice extends markedly the range of alleviation to human suffering within the gift of the resources of our profession.

It seems to me that at this time mention should be made of a condition analogous to loss of tooth-structure by attrition, eventuating in the same symptoms, which is relieved by the same treatment, and yet which is evidently *not due entirely* to mastication for its physical attributes. I allude to the marked, clean *cupping* which sometimes occurs upon the cutting edges, cusps, and articulating faces of the teeth. I regard this merely as one peculiar phase of dental caries,—a condition in which the dentine, instead of assuming the hardened and polished exterior usually the result of mastication, has become softened, and in consequence wears out much faster than the enamel. Concomitant with this decay, we find *attrition* giving to the interior and edges of these cavities that smooth, defined, and cleanly appearance so unlike the results of the ordinary progress of caries.

(*i*) *Fracture of tooth.*—This cause for pulp-irritation is not one of frequent occurrence, and yet it is of peculiar interest from its singular variety and extent.

The fracture of teeth is generally dependent upon one of three causes—viz.: 1st, impinging upon some hard substance, such as bone, oyster-shell, oyster-pearl, coal, shot, cherry-stones, nut-shells, ice, etc., during mastication; or 2d, the easier fracture, which, in consequence of somewhat extensive decay, may result from the pressure of ordinary food, particularly bread-crust, candy, crispy meats or cakes, and the like; or 3d, fracture resulting from blows, either direct violence or from falling.

These fractures vary in extent from small and unimportant pieces to those large enough to demand repair by filling; from these to those exposing the pulp; from these to the half or whole crown, necessitating either large "restorations," with various filling materials, the pivoting of a tooth, the smoothing off and filling of the root, or the extraction of the same.

The fracture of a tooth may, however, depend upon a very unusual fourth cause, viz.: congestion of the pulp. When this is the case there is ordinarily a sensation of fullness within the tooth, which rapidly passes into extreme tension and pain, or as rapidly into tense numbness and growing uneasiness.

In every case which has come under my own notice, or has been related to me by other practitioners (now numbering more than a dozen), this feeling of uneasy or positively painful tension has continued until the tooth has split with a noise which has always been represented to be like the report of a pistol, immediately upon which all pain or uneasiness has ceased. Soon, however, a knowledge of the presence of the tooth asserts itself, and it is found to be gradually more and more distressing to chew upon it, until at last the pain arising from peridental irritation, sometimes mingled with true pulp-symptoms (but rarely), will cause a demand for relief.

It is my experience in practice that extensive lesions of this kind are, except under some modifying circumstances, very amenable to treatment, which will be given in place, under the proper head of "periodontitis."

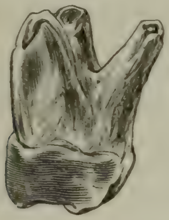
(*j*) *Disease of surrounding parts.*—In order that no seeming complexity may exist in the mind of the student of this obscure phase of pulp-irritation, I must ask constant remembrance of the fact that under the varied heads of *salivary calculus*, *tartar*, *looseness*, *abscess* and *atrophy*, or *absorption* of either gum, alveolar process, or roots, I am discussing only the effect of these diseases upon the vital pulp.

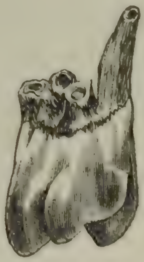
There are probably no dento-pathological conditions concerning which more doubt exists in the minds of many practitioners than those which I shall recognize under this division of pulp-irritants.

It is for this reason that I have observed them with exceeding care; have confirmed the statements which I shall give in relation to them again and again; have never neglected duplicating tests for pulp-vitality, and have frequently obtained the consent of patients to remove by treatment all symptoms of pulp-trouble in cases where, for other reasons, the teeth were to be finally extracted. These latter were instances of "lone teeth," which interfered with the proper introduction or adaptation of artificial dentures.

As the result of these investigations, I have become satisfied that an amount of disease may exist about the roots of teeth which would ordinarily be regarded as incompatible with the presence of vital pulps; and that with this the pulps may not only be living, but can maintain an astonishing proximity to health, and pass with great deliberation through the various phases, from slight to devitalizing irritation.

It is unnecessary to enter into separate detail concerning the symptoms and diagnosis of pulp-irritation from salivary calculus, tartar, looseness of teeth, the presence of pus (abscess), or atrophy of either gum or alveolar process, for these are always the same as those given from all ordinarily recognizable causes; but it is the fact of their *possibility* which I desire to impress, in order that the apparent anomaly of pain from pressure, elongation of the tooth without fullness, the presence of pus without discoloration of the crown, response to hot and cold applications, and paroxysmal toothache, can be, and are, sometimes found in teeth without any cavities of decay, or any other cause which can be detected by the superficial observer. Careful examination in these cases, with a knowledge of the *possibilities*, will, with comparative ease, detect the presence of any of the six conditions of disease before mentioned; but the existence of the last-given cause, *atrophy*, or *absorption of the roots*, is a diagnosis almost, and indeed I might say quite, beyond the diagnostic powers of any one to make with certainty.





Like the diagnosis of dental exostosis, it can only be made by "differentiation;" and even with the most accurate use of this means which I am capable of employing, I have failed quite as often as I have succeeded in my attempts.

The character of the teeth—*intensely* good and hard, with peculiarly pearly and polished enamel; the character of their setting—firm and solid; the character of their surroundings—good, elastic, *unirritated* gum-tissue; the character of the pain—neuralgic, tenderness of cheek to pressure, pain in eye, with amaurotic and possibly circulatory complications (suffused cornea and conjunctivitis); not much pain, but decided *response* from striking upon tooth; sometimes peculiar pricking sensation from pushing the tooth; *great* pain from *decided* hot or cold applications; general sense of uneasiness about the jaws and face, *directly referable* to the tooth, *and an undefinable but positive conviction on the part of the patient that its removal would insure relief*, and that nothing else would accomplish the desired object,—these are the observations to be made.

My experience in cases of this kind—of which I have had *twenty-four*, in my own practice and in consultation—has been universally confirmatory of this conviction of the patient; and I must furthermore add, as a decided peculiarity of these cases, that in every instance in which the smallest portion of root was broken off in the attempt at extraction, the pain has continued with singular maintenance of previous sensations until its removal. In previous years, the extraction of some of these small pieces was attended with much difficulty, on account of the density of jaw-tissue, and operations of apparently unwarrantable extent had to be resorted to finally, as week after week of suffering was endured, in despite of the most potent pain-obtunding applications. The final removal of the "last piece" has always been productive of a good result, though my experience has been that jaws and cheeks become comfortable much more promptly than does the eye irritation.

Since the introduction of the dental engine, I have had decidedly less trouble in these cases, as well as in all others of *difficult root extraction*, for, having abandoned the cutting through of the alveolar walls, with its ugly wound and after-pain in healing, I drill out with a fine barrel-drill the cellular jaw structure surrounding the alveolus containing the deeply-imbedded root, and then easily remove the fragment with fine thumb-forceps. It will be recognized that there is comparatively but little pain in this operation, and that the result is a neat and readily-healing wound. I have found it advantageous to introduce into these wounds a very small pellet of cotton, dipped in the usual acetate of morphia and oil of cloves obtunding paste.

In all these cases of absorption of roots there will be apparent to the delicate touch of the finger a peculiar spiculated condition of cementum, together with that absence of discoloration which is one concomitant with vitality of tissue.

(*k*) *Pulp-nodules.*—It is now sixteen years since I made my first published contribution upon this subject, and twenty years have passed since my first investigations in this connection, and it is with some considerable satisfaction that I am able to note on the one hand the accuracy and completeness of the symptoms which were given thus early, and on the other the marked gain which has been made in the exemption from painful manipulation by that change in treatment which has been suggested by the advance which I have since made in the matter of arsenical application.

I have already referred to that pulp action which results in the protective deposition of "secondary dentine," and make mention of it merely to contrast more strongly the result now under discussion, known as "nodular calcification."

In the former we note an action of almost incalculable advantage; in the latter, one of excessive irritation. The one is the result of competent effort on the part of nature, or of competent skill on the part of the dentist; the other is the unfortunate result of a slight deviation on the part of nature, and frequently requires for its diagnosis and successful treatment an equally competent skill and much apparent bravery on the part of the practitioner.

As the product of this disease, we find imbedded within the substance of the pulp a greater or less number of small nodules, of hardened consistency, presenting microscopically the induration of calcification, instead of the more complicated structural peculiarities of other dentinal tissues.

These vary in size from small grains, like fine sand, imperceptible to the naked eye, but distinguishable by pressing the pulp between the finger and thumb, to large masses, which sometimes fill almost completely the pulp-cavity.

Indeed, I have specimens in which the deposition of calcified material seems to have continued until absorption of dentine has taken place and irregular enlargement of the pulp-cavity been produced.

The shapes which these nodules assume may be divided into granular, lobular, kidney-shaped, and spicular; the granular being, as I have said, like fine grains of sand; the lobular being larger, and seemingly composed of calcific aggregations; the kidney-shaped being large masses, apparently moulded into this form by the contour of the bulbous portion of the pulp-cavity; and the spicular assuming this peculiarity from the controlling influence of the canal walls.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the society held at the residence of Dr. J. W. Clowes, No. 597 Fifth Avenue, Tuesday evening, June 20th, 1876.

President A. L. Northrop in the chair.

The following address was read by Dr. G. N. Winderling, of Milan, Italy:

Gentlemen:

Although I am not yet a member of the Odontological Society, I embrace the opportunity offered me to address you in a few words relating to my presence in your country, and to present some considerations on the matter of the exercise of our profession in Italy. As you can be convinced by the official letters I present to you, the Italian Minister of Public Instruction, wishing to establish a special chair of dentistry in the universities, took advantage of my travel, and commissioned me to visit your colleges and institutions having for their object the teaching and improvement of dentistry, and to write at length a complete report of the systems of teaching, and of the programmes of studies and examinations in use in your colleges.

The Minister, having heard my views, thought as I did, that he could not have good information and profitable direction but in your country, for America is the only country where dentistry has risen to the degree of a science seriously considered by every person, studied by men of great mind, and practiced by skillful operators. In order to facilitate the means of succeeding, I was accredited from the Italian government to the royal Minister residing in Washington. I was then introduced in Philadelphia, the first city I reached after my arrival, to several colleges, by which I was enabled to become acquainted with you. I have visited the colleges of Philadelphia and New York; I know several professors and practitioners, and I take advantage of this meeting to thank them for their hearty and friendly welcome.

I am established as dentist with my brother in Milan, where we succeeded our father, who practiced dentistry in that city during seventeen years. Although living far from America, we have always endeavored to become familiar with your systems and improvements, to say nothing of the different inventions made by my father, for which reason his name is well known to our European colleagues.

In the exercise of our profession we met great obstacles in educating the people, who were almost ignorant of the elementary principles of dental hygiene. We could hardly convince them that it was better to preserve their teeth than to extract them, and it cost years of labor to bring conviction to their minds filled with prejudices. Here, I saw that the people were educated in that matter; they endure better and without lamentation long operations, having for their object the preservation of the teeth, while in our country we seldom can keep a patient in the chair more than two hours; he soon becomes tired, excited, and intolerant; sometimes, to satisfy the patient, we are obliged to extract a tooth that could be cured with care and patience. I have seen in your offices many patients, even children, submit to some gold fillings during several hours, helping the operator by their patience, endurance, and will. In a word, your patients have confidence, which with us they lack, because we have not yet special institutions, proving to the patients that the operator has studied and is worthy of their confidence. This want makes the patient doubtful of the capacity of the operator, unless the reputation of the latter is firmly established by years of practice. But now, some institutions based on your example will be created. According to the ideas of the Minister, I suppose that the first chair of dentistry will be established in the faculty of medicine of Pavia, where I graduated. This chair was offered to me, the offering of which I am proud; for if I have no other merits, I have at least this one of having taken the initiative. Knowing the intention of the Minister, my brother and I begun, five years ago, the formation of a museum, designed to illustrate the theory of our profession, representing in wax and natural preparations dental descriptive anatomy and physiology, pathology, surgery, prothesis, and orthopedy. It is composed of one hundred and fifty-four pieces, with some preparations for the microscopical studies, and some minerals, with their products, to demonstrate the ceramic art applied to the manufacture of artificial teeth; it contains all the preparations necessary for teaching dentistry, that are not found in the numerous museums of general human anatomy.

Now allow me a short criticism: your dental colleges are not provided enough with special preparations of dental anatomy, and I think it would be useful to compose more complete museums to facilitate the teaching to the professors and the learning to the students. My museum is now exhibited in the Centennial Exposition; it will afterwards be employed by the faculty as an illustration to the lessons of dentistry. I will be glad to hear your opinion about it; here I have some samples you can observe now. You will see the entire museum when you will visit the Italian department in the Main Building of the Centennial Exhibition.

Dr. W. H. Atkinson. I think that the paper, in the mere naming of the necessities mentioned, is sufficient to carry conviction to the mind of every person who has tried to teach the advantage of having appropriate objects with which to address himself to the eye of the pupil. Certainly more progress would be made, and more profound knowledge possessed by our body, if that method were practiced. You will observe that every one who has practiced has become more intimate with the principles than those who have tried to get knowledge in almost any other way. We cannot be too thankful to our distinguished guest for bringing us such a suggestion.

Dr. John Allen. At the Centennial I had the pleasure of examining what the doctor terms his museum, and it does present a great variety of anatomical and pathological conditions of the jaws and teeth; and I could not but admire the manner in which the specimens were arranged.

Dr. E. A. Bogue. It may have occurred to the minds of all present that the paper of Dr. Winderling is an important contribution to the history of our calling. We are upon the eve of having somewhat of a history as pertaining to our own country; and, judging from the workings of the human mind, I think that we, as Americans, are a little apt to think that that means a history of dentistry. It seems to me that this paper is of a character to perhaps open our eyes to what is going on abroad, and to the fact that others, too, are at work. We are told that Italy proposes to establish dental teachings in her university. Looking back to where dentistry was a hundred years ago, I think we should have encouragement and confidence that the time is not far distant when we may indeed take rank as a profession, and when our students will enter those institutions where the most thorough training is to be had, rather than where they may most quickly obtain their diplomas.

Dr. J. Smith Dodge, Jr. I would like to remark upon the suggestions which Dr. Winderling kindly makes upon the lack of museums in colleges in this country. I have had acquaintance with two of them in different capacities, and in neither of them was there anything deserving to be called a museum of dentistry. Why should such a collection necessarily be attached to a college? It would be very useful there; but those of us who are past our college days might derive a great deal of instruction from a collection of the sort named. Why should not this society start a museum of dental objects, making it broad enough to take in everything that the dentist would be especially interested in. I do not doubt that if the gentlemen interested in this society should bring together those various objects of different kinds, now in their private collections, a very respectable beginning for a museum would be made.

Dr. C. A. Woodward presented a boy twelve years of age, for whom, one year ago, had been extracted the right lower sixth-year molar; from that time to this a large amount of pus had been constantly discharging through a fistulous opening where the tooth was taken from. The gums appeared quite healthy, no inflammation being apparent. On pressing against the chin on the left side (at times when the face is swollen), pus enough to fill the boy's mouth would be discharged.

Dr. W. H. Atkinson. I am always pained to see this kind of a case in the hands of medical men or even of most dentists, for the reason that they have not given sufficiently close attention to such cases to get at the foundation of the trouble; and they fall into a sort of routine method of management which classifies cases, and then puts them all under one category, for which iodide of potassium, quinine, etc., constitute the treatment; and *that* without any direct reference to the specific objects of the preparation, or to the suiting of the agent to the condition of the body, if it be a tonic. There is so little known about what we mean when we say tonic and stimulant and sedative, and all that, that we seem to be under the necessity of going back to the foundation of things and coming up again in our methods, and have a sort of codification of what is known,—a new and logical arrangement of what we know about the disturbances of function.

My idea of a tonic is anything that will supply needed material in the body. Anything that increases or accelerates action in the body, and passes out of the system, is a stimulant; and anything that reduces that action is a sedative. What is the reason that some bodies are cold and others are hot? The reason has never yet been written. I am not sure that I have got the last bottom truth about it myself, but I conceive it to be entirely within the pale of what is called physiological chemistry.

The tumor in this boy's mouth is a case of that low type of functional aberration that we call strumous. The supply of pabulum, out of which the tissues were fed, was not well elaborated; and then the lad has not been required to use his bodily powers to the limit of endurance, as every lad should be in order to get the full endowment of his organization. Hence this accumulation took place, but why it located in the chin I don't know. If the boy can be properly fed, it is self-curative; but it will be a very tedious matter, and may leave indurations that can never be removed.

The treatment I would suggest would be to explore the depths and find whether there is one single sinus from the place where the abscess is discharged, or whether there are little lines that run off, sinuses running hither and thither, and also to ascertain whether it is connected with a necrotic gland, that is, a dead gland. Some one of the glands in the chin may have died; and if so, that is a point that will need attention, so as to permit the pabulum that is wept out there for the purpose of healing to be built into new tissue, and not be poured out to be converted into what is called pus. When you have probed and investigated to the bottom and found out where the trouble is, if necessary, make a counter-opening, so that a syringe can wash it out thoroughly.

The constitutional treatment would be iodide of iron, principally; enough quinine to give his blood the right tone, so that it shall be in proper condition to carry the oxygen to the extremities of the vascular circulation.

I would feed him on the best food I could, and give iodide of iron, as much as would digest. You can hardly give too much iodide of iron, because whatever is not appropriated is thrown off; and that, too, is in some sort the case with quinine. The old idea was that quinine was such a terrible thing; but quinine is expensive, and we ought not to waste a particle. The best experiments have shown that no case can ever appropriate more than three grains in one day of twenty-four hours; and for this case I would advise not to exceed three grains in a day of the quinine, and that continued four months or more; find out the food he can most easily digest, the richest you can get; and occasionally give a little potash if the glands show any disturbance.

Dr. W. H. Dwinelle, of New York, read the following paper, entitled "Rapid Operations":

I think Dr. Lord is entitled to the gratitude of every intelligent member of the profession for his able paper read before this society several months ago, in which he conscientiously directed our attention to what he deemed a serious, if not overwhelming, objection to the burring engine now in use with us. He felt constrained to sound the tocsin of alarm in our camp, and bid us beware lest we might unwittingly be taking an enemy into our hands to steal away our brains and draw down our honored colors from their high standard to trail them in dust and degradation. I certainly honor him for it. It is well for us, in our onward career, occasionally to come to a halt by the wayside, to look backward as well as forward, and, in the light of the present, to note and compare the two extremes, that we may faithfully and healthfully make honest deductions and conclusions, in order to be assured that our career is indeed onward.

I rejoice that there exists this spirit of conservatism in our midst, even though it be in extreme; so long as it checks and restrains the over-enthusiasm and dangerous confidence that characterize many in our profession, who are too ready to adopt and hastily indorse the "NEW" before they have given it the test of time. Our calling should be too valuable to us. The permanent interests of our patients, and the sacred trust committed to our charge should make us cautious, conscientiously to deliberate in deciding upon the merits of all new instrumentalities, that may prove dangerous in our hands.

Although this subject has, since Dr. Lord's initial paper, been discussed somewhat extensively, still, its importance, I think, will justify me in asking your further attention briefly this evening.

In some respects the engine has great advantages over hand-working. The absolute precision and steadiness with which you can approach a given point; the rapidity with which you can accomplish your purpose, especially in much of the excavating department; the right- and other angle attachments, and the revolving disks; the burring, condensing, polishing, burnishing, and finishing of much of our gold stopping work, place the engine, as an aid in these directions, pre-eminently above all other methods hitherto known in our art, and make it, in my opinion, an indispensable auxiliary to every conscientious, capable, and progressive dentist, who studies alike the interests of his patients and himself.

Lest I may do injustice to any one by an assertion seemingly so bold as the one just uttered, I will qualify it by saying that, whereas the engine is, as a rule, most dangerous in the hands of the young and inexperienced, yet there are "children of older growths" who, while comparatively successful with old methods, are, from the force of long habits in prescribed paths, from a prejudice against the new, and from a certain constitutional inaptitude, honestly incapable of doing justice, with the engine, to themselves or their patients.

This, however, proves nothing against the engine, which, in the hands of the skillful, the experienced, and the appreciative, has accomplished so much,—it simply proves that these individual practitioners have not been successful, and that, if we are to accept their testimony, they cannot be.

> "Our art's unsparing rules
> Give us the handling of her sharpest tools."

We can use them for weal or woe. In the hands of intelligence and skill, they may be guided to the alleviation of pain and to permanent restoration; in those of ignorance and inexperience, to unnecessary suffering, to destruction and disappointment. In neither case should the instrument be accredited or condemned for the result, but the inspiration, the intelligence, and skill—or their negation—that stood behind it.

In my opinion, the engine should always be used as an auxiliary; the old method and the old instruments should always be used in connection with it. The engine never exclusively, nor to the abandonment of the standard methods and instruments established by long experience, and by the verdict of our best, in the past and the present. In many operations, and details of operations, it is vastly superior to the ordinary hand instruments, but in many others it is vastly inferior, and is utterly incapable of being substituted for them.

The highest expression of an instrument which shall be a medium of manipulation to an intelligent end is one that is so balanced as to weight, as to length, as to quality, as to sharpness or acuteness, as to delicacy and true relation to the inevitable and fixed laws of form, that it shall seemingly have such an appreciation of means to ends, and shall be so weighted,—and resting, not grasped with arbitrary over-firmness,—in the hand of the operator, that he shall be enabled to project himself, his perceptions, and his intelligence through it, and beyond it, to the end to be accomplished.

Such an instrument can only, and must ever be, a hand instrument! With and through such an instrument you become endowed with such a fine and delicate sense of quality that, even with your eyes shut, you are enabled to judge of and feel the varying textures of the entire interior of the field of your labor, whether they be soft or hard decay, dentine or enamel. There is a subtle link of sympathy and appreciation—I had almost said of sentiment—between you.

With the painter, his brush is this medium of communication and expression of his interior inspirations. With the sculptor, it is his modeling tool and his chisel. With the musician, his harp, his viol, or his organ.

This exaltation must ever be in proportion as the barriers, interferences, and impediments between the operator and the operation under performance are removed.

You have all of you read learned discussions upon the proper length that should be given the handle to render a hammer effective.

Your barber, if he be an artist, and many of them are, will tell you that, to get the finest and nicest practical sense of touch of the razor, while in use, you should have it so nicely balanced in your fingers, and should hold it with such a delicate grasp, that should one lightly hit your elbow while using it, it would drop from your hand.

A skillful and sensitive surgeon will feel the different textures of cuticle, flesh, fiber, or cartilage as he passes through them with his scalpel.

For a large class of delicate operations the engine should never be used. If you attempt to do so, you will find yourself losing that independent sense of guidance; you will have to overcome an arbitrary deadness, an inert power of resistance, fixed in opposition to yourself. Your fine sense of touch is crippled, confined, and hampered; you become subjective instead of positive,—the subtle link of sympathy, of touch, of feeling, of appreciation, is broken; all sense of quality is gone from you, and perhaps you will learn the unwilling lesson that none of these can ever be transmitted through the very useful and practical burring engine.

We cannot but concede the fact that it is a serious objection to the engine, in that it presents such a formidable array to our sensitive patients, frightfully suggestive of the guillotine, and of being ground, tortured, and lacerated by machinery.

The jar and vibration which is transmitted by it through the whole physical system is more than some natures can bear. The heating of the teeth by friction, unless great care is used, and the fact that, with the best of them, the motion is so rapid that it defeats itself, so that sometimes a few rotations of a hand-bur, or drill, are more effective than a thousand revolutions of the engine.

It scuds over the surface, and does not lay hold on the dentine to be excavated. The paddle-wheel of a steamboat may be made to rotate so rapidly that it will not lay hold on the water, and the boat will come to a stand-still, the water winding around it like a skein of silk.

Again, some points will cut so much more rapidly than others that, unless great care is used, you first make the discovery by finding you have exposed a nerve, transfixed a tooth, or undermined a wall that might have served you for a sure foundation.

These enumerated are some of the objections to the engine, many of which may be overcome; and, although it can never approach the character of, or be a substitute for, the hand instrument in a large class of delicate operations, it is, as an auxiliary, one of the most valuable contributions to our profession that has ever been made, and will always command our gratitude and appreciation.

Dr. W. H. Atkinson. I should be sorry to have that paper go before pupils who have powers to develop. The writer said that it was the intelligence that was behind the instrument that made the instrument of value. Keep that in mind. The difficulty with those persons who are opposed to the instrument is, that they have not learned how to handle it. They have not been able to send that kindly intent that the doctor speaks of through to the object.

The paper says a wheel can go so rapidly as to wind the water around it like a skein of yarn, and the steamboat stand still. I do not know anything of that kind. I could conceive of the shafts being broken, or the buckets being riddled out of the wheel, and the wheel having no effect upon the boat; but I cannot see in any such thing as that the authority to pronounce a change of well-settled natural laws. How can he apply that to the motion of the engine, and state that it defeats its own object? Whenever we have a cutting instrument,—and what is the bur but a repetition of excavators?—so many fine edges,—and revolve it rapidly, more rapidly than the waves of sensation can be possibly transmitted by the nerves, in place of defeating your object, you accomplish it so quickly that it seems as though, to both patient and operator, it had hardly begun.

We would better be careful about pronouncing our notions of philosophy as final, unless we have seen all that enters into the principles that we are dealing with. If you can accustom the carrying of the weight, as he states the barber carried the weight of the razor in the hand, then you forget that entirely, and give attention only to the slight vibration of the instrument in motion; and this is possible, because I have experienced it even with the heavy Green engine. At first the weight made my hand ache, but after a while I learned so as to relieve my hand entirely.

Another fallacy: that an instrument with a spring can cut more delicately and certainly than one without. Whenever you use the spring instrument you have added ambiguity to the result of the operation, and a man must be more than a delicate operator to regulate the effect of the spring, and whoever uses it does not seem to feel satisfied until he has felt that spring. Suppose that you are within one scant layer of exposing a pulp; the spring may be just enough to pop into the chamber, no matter how careful; and we know we may pop into the chamber with any instrument if careless.

Dr. W. H. Dwinelle. I was unfortunate in not hearing the whole of Dr. Atkinson's speech. I can only speak in reference to the few observations he made subsequent to my return into the room.

I was mistaken in using the figure of a skein of silk; it does not apply. I ought to have said that a very high speed would be ineffective, because by its rapid motion the water was rejected and passed over by the paddle-wheels, they not laying hold on it. It loses its *bite* on the water.

We have all seen the driving-wheel of a locomotive rotate rapidly on the track without moving itself at all; sometimes it is necessary to scatter sand on the track before it will take a *bite* and proceed. Ice in the winter and Western grasshoppers in the summer stop our railroad trains, because the greased or frosty track will not permit the driving-wheel to bite to, or adhere to, the track. The idea of bite or no bite is not so silly after all; the principle is recognized in mechanics every day throughout the world.

I did not intend, strictly speaking, to intimate that the steamboat would stand still if you put too much power into it. I meant relatively. I meant that there is a point beyond which the buckets of the paddle-wheel do not have a legitimate effect upon the water, and you lose power to no purpose. It is, so to speak, without a bite. It does not take hold on the water as it does with the limited rotations. I think I am established in this proposition. We do know that you can give such a rotation to an instrument like a bur or a drill that it will not take hold. That is a principle that is recognized by mechanics. It is a well-known fact that in cutting with machinery in iron turnings and work of that character, it is essential that rotation should be slow. You go beyond a limited rotation and you lose your bite. It is a notorious fact, and we can verify it every day in our practice with the burring engine. Take the best-formed, most acute, and best-tempered drill, set it going with this very rapid motion, and it is ineffective, comparatively speaking; reduce the motion and a few revolutions will be equal to thousands. I know that it is a fact that with a rotary lance, in the form of a wheel, you can give such a degree of motion that it will pass through flesh unperceived. I adopt the mode of removing the tool, and replacing it, as it thus frees itself from *débris* and is prevented from heating.

Dr. Atkinson. Can it heat without taking a bite?

Dr. Dwinelle. I think it can. A paper was read lately, by one of our members, in reference to the burring engine. The author informed us how rapidly he operated; how many teeth he could fill in an hour. He averaged one in about fifteen minutes. I think, as a rule, rapid operations are not good operations. You cannot do work requiring study and delicate and thorough manipulation and do it rapidly. It is true, as Dr. Atkinson said upon that occasion, we can, by the facilities we enjoy, perform many operations rapidly and thoroughly; but we cannot average our three, four, or five stoppings per hour without having it imputed to us that we are either inspired or else there is something rotten in Denmark.

Dr. A. H. Brockway. I had no idea when the paper was read that it would provoke discussion, and not until the remarks that have just been made did I suppose that I was called upon to say anything in defense of it. I thought, when I heard Dr. Dwinelle's paper, that I almost quite agreed with him. I saw very little to take exception to; and I think now that we generally agree. The expression, "rapid operating," is a comparative one. The criticisms which Dr. Dwinelle applies to me would apply to him with equal force by slower operators than himself. I differ from him in no degree except that I possibly work faster to attain the same results. He would advocate doing the thing as rapidly as is consistent with the degree of success at which he aims. I do no more. He would advocate sparing his patient as much time and suffering as possible. I do nothing different. I simply claim that with the burring engine, properly handled, and the rubber dam. I can do operations to my satisfaction three or four times as rapidly as without them. That is the pith of the matter. Whether I do them well or not is not for me to say.

If any one supposes that I said in my paper that I averaged fifteen minutes for filling cavities with gold, he is mistaken. I simply said that my average, for a certain number of days, was slightly less than fifteen minutes per cavity. I do not think that I average over fifteen minutes per cavity, taking gold, amalgam, Hill's stopping, oxychloride of zinc, or tin-foil. I did not say fifteen minutes per filling, but per cavity. Sometimes I fill two cavities, as I did to-day, in a second upper molar, at one operation. This I call two fillings. What proportion are gold fillings I am not able to say. I should say rather less than one-half.

Dr. Dwinelle. Are not most of the remainder Hill's stopping?

Dr. Brockway. No, sir. I do not know when I have used Hill's stopping. Perhaps in that particular time I may have used it in a number of cases. I frequently use it for children, and as a temporary stopping in adults.

Dr. Dwinelle. I never heard of a man before who performed so many operations in an hour and did them thoroughly, and I congratulate the doctor upon his remarkable success.

Dr. J. Smith Dodge, Jr. Would it not be the case usually that where most of us would speak of a "large" filling, you would count it two, three, or four, because, originally, it began with so many points?

Dr. Brockway. Certainly.

Dr. N. W. Kingsley. You charge for four fillings in that case?

Dr. Brockway. I do not, as a general thing.

Dr. N. W. Kingsley. This suggests a topic which I would like to dwell upon for a moment. I once had an unfortunate lawsuit where the question of charges was brought up. Several professional brethren were called by my opponents to prove that my charge of ten dollars an hour for filling teeth with gold was very unjust. They insisted that they did not charge by the hour; it was not a proper thing to do. On cross-examination it appeared, however, that the results of their method of charging did not bring them less than twenty dollars an hour.

The matter of charges has really been a question which I have thought upon considerably for many years, as to what is just to ourselves and our patients. While I make no rule for anybody else, I do say that I would not like to be charged by the operation, and have work done to the extent of filling a cavity every fifteen minutes, at the rate which it is now regarded among reputable dentists a man shall be paid for a filling properly inserted. When I am at work, I think my time ought to bring me so much money; and if I can put in four little fillings in an hour, my patient is entitled to the benefit of it rather than myself; and if it takes me two hours of faithful work to put in a filling only twice as big as one of the little ones, I am entitled to payment for two hours.

Dr. A. H. Brockway. I do not think it is any of the patient's business how long or how quickly the operation is done, so that it is done well. I have reason to suppose my patients are as well satisfied with an operation of fifteen minutes as if I took an hour to do the same thing; in fact, better satisfied. A gentleman who has been in my hands for ten or twelve years, and for whom I did a number of operations five or six years ago, came to me last summer, and I filled two cavities. The operation was very brief. He said to me, "You are not charging me any more than you used to." I said, "No; I don't think I charge quite as much." "Well," said he, "you have done this operation so much quicker than formerly, that I think you ought to charge more. As a business man, I am better satisfied to pay more for the same operation, because you have taken so much less time." I think that view of it will be taken by almost all business men.

Dr. Dwinelle. It seems to rest on this: Is it well done? And I must repeat that, as a rule, rapid operations cannot be done thoroughly.

Dr. Dodge. Is it a necessity that slow ones should be done better?

Dr. Dwinelle. No; but the rule must still stand good.

Dr. Wm. Jarvie, Jr. I do not know that Dr. Brockway requires any one to defend him. Still, I desire to say a word or two. In the first place, I think there is more or less misapprehension in the minds of some of the gentlemen present, certainly in the mind of Dr. Dwinelle, in regard to Dr. Brockway's paper. It did not state that these operations were all gold, and in a conversation with him I learned that perhaps not one-half of them were gold, the remainder being of such material that they required much less time than operations with gold would. The fillings of all descriptions that he put in within a period of eighteen days averaged fifteen minutes. Dr. Dwinelle has intimated rather strongly that these operations necessarily cannot be thorough. I have recently had opportunity to see quite a number of Dr. Brockway's operations, and I will vouch for the quality of them. In Brooklyn, where he is best known, he is considered one of our most able and thorough operators. Of course, as to the record of time, we are to take his word for it. It would seem to some very singular that he should be able to adjust the rubber dam in such a short time. Sixty seconds is his average time per cavity for adjusting the rubber dam. Now, perhaps the fifteen minutes per operation would be no more marvelous, if you saw it done, than the adjustment of the rubber dam in the space of sixty seconds per filling.

Dr. C. P. Fitch. This matter of rapidity in operations is relative. When I entered the profession, one great object in operating was to see how rapidly fillings could be put in. It was so all through this State. There is a constitutional difference in men: some are phlegmatic, and so slow in movement that they cannot insert an ordinary filling in an hour; others are mercurial, they are quick and nervous, and will fill a tooth just as well in fifteen minutes. I hold that a man should work to a standard. The patient has much to do with results obtained. I aim at a given result, whether it takes fifteen minutes or thirty, or a number of hours. I have worked at one tooth eleven hours, restoring and building up a gold crown.

In reference to the principle of rapidity of motion defeating itself. In the use of the engine, burs lose their bite from the fact that they clog. If burs fill up with *débris*, and do not cut until they are cleaned, we are not to suppose that they fail to cut because of the rapidity of the motion. The engine, without proper manipulation, of course, is a detriment, and should be held as such. But I can do much more with it than I can with the hand instrument. If we had burs that would free themselves from the *débris*, we should have with rapidity of motion increase of power and increase of result.

Dr. E. A. Bogue. I have seen patients of certainly three of the gentlemen who have just spoken within a few days, in my office. I saw one patient from Dr. Brockway some little time ago, and I confess, after seeing this patient, I have had an earnest desire to know how the doctor does his work. I have stood by and seen gentlemen operate, taking time enough, inflicting pain enough, and accomplishing slobber enough, for one whole day, over trifling crown cavities that could have been filled with perfect ease without the rubber dam. I have seen that sort of thing, and heard of it, until I am tired of it, and I was extremely glad to hear Dr. Brockway's paper on that point, simply as a matter of suggestion. As soon as I am able I want to go to Brooklyn and see how he does it, and then I can judge whether it is worth my while to strive to emulate his example. The patient that I did see I must say had most admirable fillings in his mouth, and if I am any judge, with the aid of some points that are rather searching under the magnifying-glass, I think those fillings will stay where they were put. I do not much think, however, that he put those fillings in in fifteen minutes, or an hour.

I am glad the question has been brought up and made as prominent as it has been. There is a deal of truth in Dr. Hill's criticism, a few meetings ago, that too much time is put upon much of our work. I do not mean to deprecate the most careful, nay, the most artistic work that we can do, where such work is called for; but I mean to discriminate between a restoration filling in a tooth of such poor structure that it must necessarily break down inside of twelve months and a filling in a compact tooth that at the age of forty for the first time needs a restoration. I want to protest against the utter and sweeping condemnation pronounced by one of our professional gentlemen within a week or two upon all contour fillings, because he had seen a number of unsuccessful ones made in the mouth of a sixteen-year-old patient.

Dr. W. H. Dwinelle. I feel constrained to say a word or two further, to disclaim all thought of personality in anything I have said to-night. I respect a man none the less because he honestly differs with me; certainly this could never be ground for entertaining personal feelings.

Adjourned.

AMERICAN DENTAL ASSOCIATION.—SIXTEENTH ANNUAL SESSION.

(Continued from page 641, vol. xviii.)

Second Day—*Evening Session.*

The subject of Operative Dentistry was still under discussion.

Prof. McQuillen said that in 1856 and 1857 (*Dental News Letter*, vol. x. p. 69, and vol. xi. p. 199) he instituted experiments with different forms of gold, and came to the conclusion that what is called soft foil was better adapted to saving teeth than cohesive. He found in filling cavities in a steel plate that he could not get as much cohesive foil into a cavity as soft foil; the difference was one grain in ten. The cohesive foil fillings were made by an advocate of that method. He had objected at that time to the use of annealed foil on account of its tendency to arch over and leave spaces unfilled. He has learned, however, that there is a value in annealing; that it has its place. In a majority of operations he would bring soft foil into contact with the parietes of the cavity, and use cohesive foil for enameling.

Dr. Crouse has a very strong prejudice in favor of soft foil; at one time, however, he had used nothing under No. 60 for a year. These fillings stand well, but cavities can be filled in a great deal less time than by that method. Arching the foil in the center makes little difference, if the margins are perfect. A handsomer filling may perhaps be made with cohesive foil, but more malleting is required, and there is more danger of breaking the margins. He thinks it a mistake to suppose that cohesive gold will not adhere if pressure only (without a blow) is applied. He does not like so many extractions and replantations; rarely finds cases which it is necessary to extract; has not seen a case of abscess in ten years that he has not cured.

Dr. Shepard explained his position taken in the morning as to cohesiveness. A rope has the greatest number of arches; a ribbon or mat is of the same nature, but to a less degree; there is a theoretical combination of air spaces,—elongated arches. There is difficulty in perfectly consolidating on account of case (or surface) hardening. In using cylinders there is nothing of this kind; there are no arches, there is no resistance. The gold works as it does in beating, when several hundred sheets are beaten at once; the force is equally applied throughout the whole mass. If a rope is not too large, good fillings can be made with it. Cohesive gold is required only where strength is needed.

Dr. Butler. There should be a selection of different kinds of gold for different teeth. Good saving fillings can be made with either kind of gold, but non-cohesive foil has been used the longest and most successfully. Certain operations can be made as well with one as the other. We must adopt the elective system. The first annealing makes gold cohesive, but annealing a few times makes it less cohesive, and the quality cannot be restored. There are thousands of teeth in which we do not want to use gold, and cannot use it successfully, but gold only is spoken of. Are we following practices which we are ashamed to own in public? Tin is a most admirable thing, and should not be called a base metal. At certain ages of children, teeth can be better saved with it, and the operations can be performed quicker, than with gold. He sometimes feels that in using gold he is introducing a foreign substance into vital organs; there is no compatibility between it and the tooth. Shall we simply patch up and mend with a foreign substance, and not seek more than we do to prevent decay? We must take the condition of the tooth, the age of the patient, etc., into the account.

Dr. Clowes. For any one to say that he can save all teeth in one way is the same as for a doctor to say that he can cure all diseases with one remedy. He knows that no set of teeth that are much decayed can be saved with one material. Tin is a most excellent filling. He formerly used non-cohesive gold, but would not now go back to it. Amalgam is a very good filling; oxychloride promises to be the most wonderful of all. None of these are temporary fillings when used properly. Hammering is harsh treatment, and many teeth have been lost by it. Proper separating has as much to do with saving teeth as filling has; contact must be prevented to save the tooth permanently. There must be round corners and no rough places. Oxychloride is the most perfect filling for roots; abscess goes away immediately under such treatment. He fills roots and cavities at the same operation, and all is lovely. He forces the oxychloride up into the roots with pellets of bibulous paper, which are afterward removed.

Dr. Field has swung around the circle in regard to different kinds of gold; has used cylinders and all other forms. He had heard nothing new about it yet. He wants to know what this replanting is done for,—convenience to the dentist? It reminded him of the doctor who threw his patients into fits "because he was death on fits." He thought that, with the exception of isolated cases, there was no reason for this practice.

Dr. Keely mentioned a case of a second superior molar, decayed on posterior surface, difficult of access, and pulp dead. Six months would probably have been required for a cure. It was extracted and the roots filled with gutta-percha, a cavity in the third molar was filled, and the tooth replaced. It was necessary to clip off the buccal root in order to do so. This was twelve years ago, and the tooth is doing good service yet.

Dr. Bogue said he had performed the operation three times; once it was a failure. There was an abscess from half an inch of cotton protruding through the apex. He then spoke of the restoration of a front tooth with platinum-foil in such a manner as not to be observable, and which completely remedied a hissing which had been caused by the separation between the teeth, and which annoyed the patient (a clergyman) very much.

Dr. John Allen spoke of a case where four front teeth were knocked out of the mouth of a boy thirteen years of age; the teeth fell in the sand, but were replaced and did well, and did not lose color; he thought there had been union of the lining membrane. He had had cases so sensitive that it was impossible to excavate, and had extracted and returned with success, though he had had failures. He also mentioned a case of a lady who had a front tooth which appeared to be of much better quality than the rest, and on inquiry she stated that

that tooth was extracted from her little negro boy's mouth and replanted in her own; it had done well.

On motion, the subject was passed.

The subject of Dental Chemistry was then taken up, and Dr. S. B. Palmer, chairman of the committee, read a report, of which the following is an abstract:

Dr. Palmer's report was mainly a review of the accumulated literature of the year past, on the subject of applied dental chemistry only, thus excluding much that might come under the general head of chemistry; the aim being to present principles and not men, facts rather than theories. The first paper alluded to was one by Dr. H. S. Chase, read before the Illinois, Iowa, and Missouri State Dental Societies, and already published in several journals. Of this it was attempted only to give the fundamental principles. Dr. Chase commences his paper by comparing the oral cavity to a single cell of a voltaic battery, where the mixed saliva, decomposing food, acids, etc., answer to the fluids of the cell. According to electrical laws, the greater the departure of this fluid from a neutral or slightly alkaline condition the greater the chemical effect upon the tooth, which voltaic electricity has the power of decomposing, as it has other animal substances, and even metals. The healthy mouth is not in a condition to disintegrate dentos. Thermo-electrical currents may be set up by sudden changes of temperature, and the mixed saliva has more or less power to set up electrical reaction in fissures and between the teeth. There is probably more or less electricity in the ordinary mouth, particularly if metal fillings are present. These currents, in the opinion of Dr. Chase, do no harm, except when by quantity, intensity, or constant direction, they produce chemical disintegration of the dentos, or pathological changes in the pulp, or dental fibrillæ. When plugs leak so as to give the mixed saliva access to the walls of the cavity, we have in such tooth a battery; and there are as many batteries of a single cup as there are such leaky plugs in a given mouth. Voltaic currents may be evolved, not only from two metals one of which is not acted upon, but from metals both of which are acted upon; or between these and other substances. That element is called positive which is most easily acted upon, and the current passes from the positive to the negative. Change of fluid in the cup will often change the relative positions of the elements. Dr. Chase says the elements of batteries which are sometimes found in the mouth are enamel, dentine, muscle, amalgam, tin, gutta-percha, and oxychloride of zinc. Each metallic plug forms a battery by its union with the tooth; if the plug is tight the electrical action is united to the margins of the tooth, but if leaky it extends within the cavity. This statement of Dr. Chase sounds much like that contained in the report of your committee of last year, which originated with them, but its repetition will do no harm. Dr. Chase further says that every material for plugging teeth is negative to dentos; consequently the latter is placed in a critical condition by every plug it receives. That material which stands nearest to dentos in the scale would give the greatest assurance of safety, so far as disintegration of the tooth-substance could be caused by an electrical current, and its formation of a battery in connection with a negative substance. In another article, the same author says that gold being so much farther removed in the scale from dentos than any other filling material that we now use, is the most dangerous one we can plug a tooth with, if its preservation is the sole motive of the operator; but when beauty is considered it must often be used, even at the risk of permanency. The best of alloys are safer than gold in any cavity. . . . Pure tin-foil is safer than gold in any cavity in which it can be properly placed. Mention was then made of the practice of using gold and tin combined, which gives the optical effect of gold combined with the preservative effects of tin, by lining the cavity with tin and filling with gold. In a paper read before the New York State Dental Society in July last, the electrical action resulting from this combination is thus defined: "So long as a filling of gold and tin remains moisture-tight, there is no action beneath a plug of any material; but when the plug fails to exclude fluids, the moisture reaches the plug through the poorly organized dentos, the tin becomes oxidized to a greater degree by reason of its connection with a negative element,—the gold; the oxide of tin, the antiseptic sought to arrest decay, is furnished in greater abundance by combination. As this substance is formed the tin is incrusted with it, and the current ceases. The same principle underlies all alloys. The same paper mentions the action produced by two or more fillings in the same tooth or in close proximity in opposing teeth. Facts disagree with theories based upon non-conductivity of dentos, which was said to prevent chemical action between fillings of different materials. Science teaches that each separate filling in connection with dentos is a battery; thus two fillings separated by a thin partition of dentos are two batteries acting upon and through the separating walls. Approximate fillings of gold, tin, amalgam, etc., must be regarded as two distinct batteries when, by the introduction of food or any connecting medium, they become connected, and the current passes through the dentine and pulps (if present), to the annoyance of the patient. Since this class of fillings cannot be firmly united, chemistry teaches that they should be thoroughly separated.

The report alluded to a paper by Mr. Thomas Fletcher, read before the New York Odontological Society, on Discoloration of Amalgam.

That writer claimed to have discovered an absolute law ruling all plastic fillings, and which gives a rule for testing all new compounds with certainty, and gives the condition under which any alloy requires to be worked to give the best possible results. The foundation of this principle is: Given, any crevice or joint between two surfaces, one or both of which can be made to yield to pressure, the presence of an excess of moisture at the edge of the crevice, or in the body of one of the surfaces, involves the parting of the two, and penetration of moisture by the force of capillary action. This power is always ready to act, and is sufficient in the course of time to change entirely the form of any filling which will yield. In the estimation of the committee this principle is worthy of consideration. In relation to oxychloride, Mr. Fletcher shows further on that he is well acquainted with its action, and in private correspondence he acknowledges that we are either in want of a more reliable article, or a law to use what we have, by which to secure better results. The experiments of your committee indicate that chemical law is against the success of a compound of this nature, which is itself decomposed by an alkaline reaction. Permanency of this material is yet to be attained, though much has been said in favor of it of late.

The report then quoted from an article in the *New York Medical Record*, showing that the medical profession, too, is investigating this subject. The writer said, "In any febrile condition, the fluids of the mouth are as constantly and intensely acid as any medicine administered by the physician, and from the high temperature at these times the power of these acids for evil is greatly augmented. The consequence of this is a rapid decomposition of food, etc., and the elimination of other deleterious acids, all forming a mighty power, under which it is not surprising that tooth-structure should melt away like dew before the sun. It is more surprising that any tooth should live to tell the tale."

The report then alluded to the discovery of an agent intended to be introduced under gold or other fillings, for the purpose of allaying irritation from the plug, reducing thermal shocks, etc., by Prof. E. W. Foster, of Boston. After many experiments, this gentleman concludes that hypophosphite of lime, introduced into a cavity previous to filling, will, in addition to the above benefits, enter the dentinal tubes, and in a measure do for a poorly calcified tooth what nature failed to do, —restore it in a degree to a normal condition, stimulating nature to complete the work of calcification as it could not do when subject to irritation. Tests made by the committee to ascertain its relation compared with dentine and the various filling materials show wonderful harmony.

Adjourned.

(To be continued.)

AMERICAN DENTAL CONVENTION.—TWENTY-SECOND ANNUAL SESSION.

(Concluded from page 645, vol. xviii.)

THIRD DAY—*Morning Session.*

PROF. WINDER read a paper upon the secretions of the mouth, of which the following is an abstract:

The paper said that the secretions of the mouth might be the best index by which we may judge of constitutional health, and may be instrumental in producing constitutional weakness or even disease. The writer felt as though he might be premature in expressing opinions on the subject, as while he had examined a large number of mouths, it was only so far as tests with litmus-paper were concerned. Even if we had the statistics of this country, the question would arise, are they normal or abnormal? Only by extending our inquiries to a people where diseases of the teeth are unknown could we ascertain what is a normal condition of the secretions.

The paper then quoted from Carpenter, who states that the saliva is always alkaline in health, the degree varying under different circumstances. The theories of Claude Bernard as to the differing functions of the various salivary secretions were alluded to. It was stated that Bidder, Schmidt, and Claude Bernard assert that neither of the salivary glands has in its separate secretion any power of converting starch into grape-sugar, but that the admixture of these is necessary for the generation of this ferment, and they assert that alkalinity is essential to this process. Carpenter, however, says it has been shown that the action continues in the stomach, notwithstanding the acid condition there found. Doctors disagree, and we are without reliable demonstration of facts. Flint says that the reaction of saliva is normally alkaline, though under certain circumstances it is acid; Küss also makes the same assertion.

The writer is well convinced that caries of the teeth, and diseased conditions of the gums and alveoli, are *pari passu;* the more ravaging the decay, the more diseased the soft tissues; but whether the vitiated secretions are cause or effect, remains to be decided.

Wood's "Practice of Medicine" was then quoted from in regard to the absorption of the socket and loss of the teeth. This author takes the ground that the disease is generally incurable. The causes are considered to be, residence in low, damp places, the action of mercury, the presence of tartar, depressing emotions, suppression of hemorrhoidal and other discharges, scrofula, and syphilis. As means of cure the actual cautery and excision of that portion of the gum which has been deprived of bone are recommended. The author quoted, and others mentioned, agree with Dr. J. M. Riggs, of Hartford, Conn., in his description of what is now known as "Riggs's Disease," in the treatment of which he has been eminently successful. In this disease there is unquestionably a discharge from the gums and alveoli, which affects the secretions of the mouth.

The essayist then stated that in consequence of the array of authority in favor of the alkalinity of the saliva, he was reluctant to question the truth of the statement, as a sense of duty compelled him to do. He had for some time been investigating mouths, as regards the reaction of the secretions, and had found them under all circumstances *acid.* He had applied the tests to probably one thousand persons, under all circumstances, and had met with but one solitary instance of decided alkaline reaction. This case was that of a young man who, to use his own words, had been on a terrible drunk, and had eaten nothing since his debauch. In connection with Drs. Riggs and Mills he had examined carefully the mouths of one hundred and fifty-five children at the Home of the Friendless, about two hours after eating. He had failed to find a single alkaline reaction. The fact was then alluded to that the character of the secretion varies according to the variety of epithelium which secretes it.

The query was then raised whether this acid condition, if it does exist and is abnormal, may not be one of the causes of the rapid destruction of teeth in this country, and is it not the proper subject of careful investigation? The essayist alluded to a paper by Dr. George H. Cushing, of Chicago, published in the transactions of the Illinois State Dental Society, which stated that the writer (Dr. Cushing) had found the same acid condition of the saliva. The United States Government has kindly consented to assist in collecting statistics in regard to the secretions of the mouth. The results of investigations of the Sandwich Islanders showed that their teeth are found in the most perfect state of development, and almost entirely free from disease.

The paper being open for discussion,

Dr. Mills (of Baltimore) indorsed the statements of Prof. Winder, as to the condition of children's teeth. He hopes the paper will awaken the interest of the profession in the subject, that we may discover what may be done to prevent this prevailing acid condition. Our work is to a large degree full of faults, and this is the cause.

Dr. Atkinson. As a rule, we have been under the ban of text-books, and their authority; but mankind is aggressive, and can only pronounce conclusions as they have been able to arrive at them. He does not regard it as settled which is the active agent,—whether acid is a cause or a concomitant result of decay. He indorses the statement as to the function of epithelium. We are under the ban of self-sufficient projectors of doctrines, who cannot justify their positions. Changes in the production of saliva involve deeper questions than mere secretion: first, ancestry; next, manner of feeding; the process of digestion, the last act of which presents us with the juices of the flesh. The title of M.D. or D.D.S. is by no means conclusive that its possessor has what is implied by it. The saliva varies according to the mental state; it is never normal when a person is "half mad." It is not a question for novices, but it has been pronounced upon as if settled. There is a great difference between carnivorous and graminivorous animals. It is important that we should understand the foundation principles of the satisfaction of the bonds of affinity if we would know the conditions of health and disease. The current of saliva is changed by the different forms of epithelium through which it passes.

Dr. Walker. This is one of the most important questions. Teeth are deteriorating, and we mourn their terrible condition. Is this owing to the condition of the saliva? We have called the saliva alkaline, but the investigations of Drs. Winder and Cushing seem to throw doubt upon the question. If this is an abnormal condition, we want to know how it is brought about.

Dr. Cunningham, of England, said he indorsed the paper, and recognized the value of the inquiry. Dr. Cartwright, who has written upon this subject, advised the constant use of litmus-paper; and if we were in the habit of using it, results would be brought out. He had had difficulty in getting alkaline saliva. He called attention to the fermentation of saliva if left on the paper, which would produce a change of color. The saliva should be washed off from the paper with distilled water at once after testing. Dr. Tomes does not decide whether the acidity is cause or effect, but says that it plays an important part in caries. If the saliva is acid, there can be no great deposit of salivary calculus. The speaker then described upon the blackboard an apparatus by which he had tested the different filling materials in an electro-physical point of view, by which it appeared that gold occasioned the greatest deflection of the galvanometer.

Dr. Hunt. The paper and this discussion are on the right track. We should collect facts, as only from them can conclusions be drawn, and we must take all influences into consideration. There is difficulty in testing with litmus; we must confine our observations to the moment of contact. In our investigations we may become iconoclasts; many principles of the text-books will have to be broken down. The facts detailed would seem to indicate that acidity is an abnormal condition, because where it exists we find decay. We have a prospect of obtaining the characteristics of saliva among the Indians of the Northwest; we want to get out among nature's children.

Dr. Mills. It was said that salivary calculus was less where there is an acid condition. He had noticed a more rapid deposit when the system was debilitated, and that persons returning from spending a month in the woods had clean teeth. This would seem to refute the statements of Tomes—but even he is liable to make mistakes. Tomes states that he had never found tartar under thirty-five years of age, but some of the most marked cases are much below that age. It is a question of infraction of law; the question is, What are we going to do about it? When we get back to first principles we shall find no difficulty about the conditions of health and disease. It seems to be general to find an acid condition, and can we not find some practical way to counteract it? As far as we can get back to first principles and break up this acid condition, we shall arrest the general deterioration of the teeth. We are doing the best we can in our operations and teachings, and doing what we can to improve the unhealthy condition of the mouth, and by that means the organs of digestion and the general system. We find an unhealthy condition brought about by salivary calculus, aggravated by old age and inherited tendencies, and the inference seems to be that it is not curable, except in the early stages. He does not give Riggs any particular credit in his treatment of this disease, except for being faithful. There is a possibility of making a marked improvement in this condition; ninety-five per cent. of the cases are amenable to treatment and to cure; in some degree even the worst cases are so. It is a mechanical operation entirely, and our want of success has been owing to want of thoroughness, and because we have not had the necessary instruments. With Riggs's instruments he can produce results that he cannot with any other. Ever since he had seen the treatment he had been working at it; he had followed Riggs up, and found that he had patients from all sections of the country; he is a specialist in that department. He had heard that it was a brutal treatment, but he had had it tried on himself, and found himself disappointed in that respect. This had increased his interest in it. He had lain awake nights to get hold of the peculiarity in Riggs's operations, and it had come to him, and he is now uniformly successful. It needs practice and a peculiar motion to get off all the deposits and do it thoroughly. Riggs claims that there is necrosis all around where the dissolution is going on, and he goes down below the disease and removes it with instruments shaped like a snipe's bill. There is a good thing in this if men will lay aside their prejudices and take hold of it. Many allow their prejudices to govern them. The impression prevails that this disease cannot be cured. As many teeth are lost by it as by decay. A very insufficient fee is usually charged, often only fifty cents. It cannot be done thoroughly for such prices. It takes from two to ten hours, and people will pay for it when we do it. The operation is entitled to a place in oral surgery, and will be a blessing to patients.

Adjourned.

Afternoon Session.

This session was devoted to the selection of a place for the next meeting and the election of officers. The place selected was Deer Park, and the officers elected were as follows:

President.—W. H. Atkinson, New York.
Vice-President.—J. R. Walker, New Orleans.
Treasurer.—J. G. Ambler, New York.
Corresponding Secretary.—G. A. Mills, Baltimore.
Recording Secretary.—Ambler Tees, Philadelphia.

Adjourned.

Evening Session.

Dr. Tees described a new rubber dam clamp which he had devised, with a broad lip to keep the rubber from interfering with the view of the cavity. Also a pair of lancet-beak forceps for extracting roots.

Dr. Atkinson in a few remarks accepted the office of president, to which he had been elected, giving as his reason for doing so that he was assured that his services were needed, and that he could not go back on his record, which pledged him to assist in every effort for the advancement of the profession.

Dr. Walker read a paper on "Tooth Culture," of which we give an abstract, as follows:

Prof. Walker's paper opened with a contrast between the efforts on the part of cultivators of the highest forms of animal and vegetable productions and the efforts, or rather lack of efforts, in the culture of humanity. The result in the former cases has been the evolution from meager types of beautiful cereals and vegetables, luscious fruits and fragrant flowers, and highly-bred animals; while as regards human development we have a race of pigmies, among whom sound health and perfection are the exception and not the rule.

The proper development of the human economy depends upon good digestion, and that process upon thorough mastication; this makes evident the importance of this branch of the subject. The old idea that changes in the tooth-structure cease at maturity is exploded, and it may be considered established that nutrition is in continual operation throughout the tooth. This truth understood, conviction will be carried to all, that the causes which conduce to a normal development or produce an abnormal condition should be well understood. Without favorable circumstances perfection cannot be attained; and a good masticating apparatus is an important condition in the culture of humanity. The necessity of a general knowledge of the modes of culture by which such teeth are produced is therefore obvious,—not only as regards the medical and dental professions, but as regards common-school education.

Teeth, even of the aged, are liable to change, and to become softened through removal of the lime-salts. These can be restored by a compliance with the necessary requirements,—a knowledge of the chemical elements of tooth-structure, the source whence they are obtained, and of the conditions under which and means by which deficiencies can be remedied.

The paper then called attention to the result of experiments and investigations made during the last few years regarding the best method of supplying these deficiencies when it cannot well be done by regulating the diet, or where a more rapid method is desired. The fact that in localities where lime abounds in the soil and in the water the teeth are so much better than in those where lime is deficient and cistern-water is used for drinking, suggested the administration of lime-water to supply the deficiency in the chemical elements of tooth-substance. It has been found to work admirably in all conditions of life, rendering the teeth hard and firm, and usually improving the general health. We are in the dark as to how the carbonate of lime thus becomes the phosphate of the tissues, but that it is done is fully established. The experience of the writer, who practices in a locality where lime is more markedly deficient than in any other within the territory of this organization, had been peculiarly interesting, with unusual opportunities for observing the conditions resulting in a deficiency of lime-salts, and the results of different methods of restoring proper conditions. He had observed that among Creoles, or families that had been residents of the Mississippi Delta from four to five generations, a good average condition of teeth prevails; while the children of those who have emigrated from more favored surroundings, where lime is abundant, and whose assimilative organs are accustomed to a good supply, do not have the power of extracting from the limited quantity furnished in diet and drink the necessary quantity; but in a period of time varying from six months to as many years, the teeth become soft, and yield readily to any specially unfavorable influences. Under these circumstances a proper administration of lime-water will not only enable these individuals to restore their soft and delicate teeth to a good, healthy condition, but to give to their children well-developed and substantial dental organs, not only under favorable conditions of heredity, but, even when those conditions are unfavorable, furnishing their children with better teeth than their parents had. In proof of this, numerous cases in point could be given.

An interesting microscopical exhibition was then given by the actuary of the Franklin Institute, in the hall of which the sessions of the convention were held. By the aid of a projecting microscope a large number of specimens were shown, including sections of vegetable and animal structure and a collection of sections of teeth, which were explained by Dr. Atkinson, after which the convention adjourned.

FOURTH DAY.

Dr. Leslie read a paper from a printed copy of the *British Journal of Dental Science*, on the subject of Gold.

The paper read by Dr. Walker, last evening, on "Tooth Culture," was then opened for discussion.

Dr. Walker said, We have been too largely repairers; our efforts are too mechanical; we have paid too little attention to remedial agencies. Our highest object should not be to replace or restore, but to study the methods of supplying future generations with teeth which will not need repair. It is thoroughly practicable, by understanding the functions of nutrition, to restore teeth whose physical integrity is impaired, even where it is impossible to control the diet. This last may be the best way, but it is not practicable in his locality. He mentioned the case of a young man who went from New Orleans to Virginia, and remained some time, during which his teeth improved; but in one year after his return to the Mississippi Delta they had become so soft that he was afraid to put in gold fillings.

Dr. Winder. Lavater says that strong, well-developed teeth are always concomitant with good temper. A full development of organization conduces to placidity of disposition; the most irritable people are in poor health. The facts of the paper are proved by experience. In animal breeding these things can be controlled, but not in human breeding. The mixing of races causes deterioration; the skulls of half-breeds can be easily selected. In hybrids the male indelibly marks the character of the progeny, but only the dam gives character to race-horses, and dam relationship only is recognized by turfmen. He is not willing to place himself on record as to whether it is possible to breed teeth.

Dr. Clark, of Philadelphia, exhibited sets of teeth carved in walrus-bone forty years ago, and spoke of the progress that had been made in his day.

Dr. John Allen. When the Creator made man he knew what materials to use. Do we use these materials, or do we reject them? If we use them, we shall have the creature as the Creator intended. In endeavoring to answer the questions, why do teeth decay, and why do Americans have worse teeth than others, we say it is because they discard the mineral elements in their food. The peasantry in Europe and other countries, who do not do this, have good teeth. Travelers tell us that the various savage tribes of Africa and other countries have good teeth.

Dr. Walker. What we want to do is to make good teeth among

Americans, who do use and will use the bolt. We require something which will control or restore the natural condition.

Dr. Coy. Cohesion of gold is annihilation of space between the particles. Now we can get more cohesion by using higher numbers, and avoid all contraction. It is not necessary to mallet the walls of a tooth. Cohesive gold has been abused by being used in the form of ropes. Give us thick gold and smooth-pointed instruments, and when it is struck once it will cohere. If two plane surfaces are brought together there will be cohesion, and no contraction or drawing, no straining of the enamel. It is not necessary to mallet gold till it rings like an anvil. Too many fillings are strained by malleting.

Dr. Neall, of Philadelphia, has an admiration for Dr. Allen's theory, but thinks the average teeth of Americans are as good as those of the Scotch, whose diet is oatmeal; he has observed this in his practice among the Scotch, and learns the same from those who have practiced in Scotland. He also learns that the Kaffirs of Africa are troubled with the toothache. Some other cause besides that mentioned by Dr. Allen must be found for this deterioration. Want of cleanliness is a great cause.

Dr. Clark. Children's teeth will be decayed almost from eruption when their mothers have been suffering from a mouthful of bad teeth. Negroes' teeth are naturally strong, but in fact they are as bad now as those of the whites. The contrast between the white teeth and black skin is striking, and gives the impression of good teeth. His children have to brush their teeth before breakfast, or they get no breakfast.

Dr. Reynolds has discovered that there is such a thing as striking too many blows, and discontinued the use of the electric mallet, for one reason, on that account. He finds teeth that have not been malleted so much do the best. One patient had counted the blows till thirty-five thousand had been struck, and then gave it up. He is satisfied that too many teeth are strained by so many blows.

Dr. Winder said he could prove from government statistics that the teeth of the negroes of the South are worse than those of the whites, and they have been eating corn bread almost entirely, and using no bolting-cloths.

Dr. Allen. Corn possesses less of the mineral element than any other breadstuff; it hasn't one-fourth as much as others. Rye possesses the largest amount of the phosphates.

Dr. Coy denies that eating of lime gives it to the bones or the teeth. If you have good blood to assimilate, you can get lime enough from any of the foods.

Dr. Walker. Dr. Coy is right: the lime, if present, will not be incorporated into the system unless it is assimilated; but we cannot supply the demand if the supply is poor. Salivary calculus is not found in cases of diseased teeth, but in connection with diseased gums.

Dr. Coy said that he had a boy, four years of age, who eats no meat, but lives upon milk. He can get out of it what he needs, and is strong and healthy. We should give the stomach what it calls for; obey its desires if it is not diseased. If a child desires corn-bread, it is excellent food. Sweets should be avoided. If the stomach is in tone the desires of nature should be followed.

Dr. Ambler protests against that theory.

Dr. Allen. The system cannot create lime; it must be put into the system.

Dr. Winder. Where do the carnivorous animals get lime?

Dr. Allen. From the bones of small animals, which they chew up.

Dr. Coy. Any one who admires contour fillings admires what is merely jewelry. He is conservative; uses contour fillings, but avoids all appearance of gold in the front of the mouth. Some other means of advertising should be adopted by the dentist. He does not like the appearance of full contour fillings. He would prefer to see such out of the mouth. He follows a compromise between contour and the old style; protects the walls and shows no gold, and does not pound the enamel; is in favor of cylinders and soft foil, but not in favor of any one style of work.

Dr. Leslie. Gentlemen do not realize the nature of gold, and how easy it is to injure it. Too much power is applied by the mallet. The evil results will not be found from hand-pressure. Points of instruments are too small; if they were larger, so many blows would not be required. Why is it that gold will not cohere when burnished? If smooth points have been used, it will cohere; but the surface receives from the burnisher an additional amount of condensation, and is harder than the piece to be added. If the mallet is used, it should be in a moderate manner.

A paper by Dr. Mills upon the "Health of the Dentist" was read by Dr. Atkinson.

Dr. Mills's paper took the ground that dentistry was not an unhealthy calling. The instances mentioned by Dr. John Allen, in his paper read before the American Dental Association a year since, were referred to, and the writer stated his belief that in those cases dentistry had nothing to do with their tragic end. The only foundation for the protection of our health is to be temperate in all things. Admitting that there are in the practice of dentistry not a few difficulties very harassing to a sensitive nature, and which do not contribute to good digestion, sound sleep, or amiability, the writer still thought from his own experience that this might be overcome. He had entered the profession twenty-two years ago predisposed to inherited pulmonary disease, but now at forty-five was in better health than for twenty years past. Dentistry had been from the first a passion with him, and he had pursued it with diligence. Enthusiasm (wisdom with zeal) will pull one through herculean difficulties and physical disabilities. Many old in the profession, who had devoted themselves with a single eye to its advancement, are still full of vigor. An earnest, honest pursuit of legitimate labors is conducive to a sound body and mind; and if, as has been said, dentistry is the cap-stone of all professions, then, if so followed, it ought to be more conducive to health than any other.

The president announced the executive committee as follows: Drs. Winder, Townsend, Reynolds, Mills, and De Lange. After the reading of the treasurer's report, and some routine business, the convention adjourned.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

At the annual meeting of the above society, held at the hall of the Pennsylvania Dental College, on the evening of October 10th, 1876, the following officers were elected to serve for the coming year:

President.—Dr. Robert Huey.

Vice-President.—Dr. E. R. Pettit.

Recording Secretary.—Dr. Jos. Pettit.

Corresponding Secretary.—Dr. W. H. Trueman.

Treasurer.—Dr. E. H. Neall.

Librarian.—Dr. W. H. Trueman.

Reporter.—Dr. Theodore F. Chupein.

Committee on Membership.—Drs. T. L. Buckingham, Spencer Roberts, and G. T. Barker.

The following preamble and resolutions were adopted on the death of Prof. Elias Wildman, by a respectful vote, each member rising from his seat:

Whereas, Death has suddenly removed from the scenes of his usefulness our late fellow-member, Prof. E. Wildman, M.D., D.D.S., and

Whereas, We are desirous of expressing our regret at his decease and respect for his many virtues; therefore

Resolved, That by the death of Prof. Wildman the community has lost a good citizen; the dental profession one of its most useful workers,—a man whose writings were clear, practical, and instructive, whose investigations were unusually exhaustive, and whose efforts as a teacher were zealous, untiring, and eminently successful.

Resolved, That the Pennsylvania Association of Dental Surgeons has lost a member whose character commanded our highest respect, whose uniform kindness and courtesy endeared him to us, and whose long life was unselfishly devoted to his profession.

He is gone, but his works will live after him. A benefactor to his race, he did not live in vain. His memory will ever remain green in the hearts of his grateful associates.

Resolved, That these resolutions be entered upon the minutes, and a copy transmitted to the family, with whom, in their bereavement, we heartily sympathize.

[Signed] JOSEPH PETTIT,
G. T. BARKER,
T. L. BUCKINGHAM. } *Committee.*

PHILADELPHIA, October 10th, 1876.

TRANSPLANTATION AND REPLANTATION.

The above subjects having been selected for the evening's discussion, Dr. G. T. Barker said: Transplantation signified the insertion of a tooth extracted from the alveolus of one subject, and inserted into the socket of another; while Replantation meant the extraction of a tooth from one subject and replacing the same tooth into the same socket of the same subject. The operation was not new, but had been practiced to a considerable extent many years ago, even prior to its revival by John Hunter. Transplantation was, however, discontinued because of the danger found to be induced by it. Four or five years ago the operation had been revived, and many operators professed to replant teeth which had been affected with alveolar abscess, which had defied treatment by the ordinary plans or methods of cure. Emboldened by their successes at replantation, others had attempted transplantation. He condemned the operation of transplantation, from the risk and danger of the transmission of disease in cases where one of the subjects was scrofulous or syphilitic. He favored replantation, especially where subjects had lost their teeth by blows, falls, or other accidental circumstances. He contended that the pulps of replanted teeth should always be removed, and an aperture left, leading from the pulp-cavity, for drainage. He deprecated the manner of replanting them without the removal of the pulp, or of leaving the root entire. He believed tetanus was caused, or might result, if the root was not amputated at its apex, from the impinging on the nerve at the bottom of the socket. He believed tetanus was caused by the impinging of nerves at their periphery as well as by septic poisoning, and instanced the circumstance of a gentleman who was leading a comparatively tame cow by a piece of cord tied around the animal's horns and wrapped around his fingers, when he accidentally stumbled, the animal took fright, pulling on the cord, which lacerated the nerves of the fingers to a great extent; tetanus set in, and he died from this horrible disease.

Dr. B. gave a vivid description of tetanus, with all the horrors attendant and incident thereto. He favored cutting off the end of the root to the extent of one-eighth of an inch, and smoothing the edges thereof, and before reinserting the tooth he invariably wiped out the socket with a weak solution of carbolic acid and water. He had had some considerable successes at replantation as well as some bitter experiences. He had successfully replanted *six teeth* for *one* subject; but on an attempt at the seventh, for the same subject, tetanus had set in, which had nearly terminated fatally. He believed it had been brought about by septic poisoning in that case. He said tetanus was of two kinds, idiopathic and traumatic. A prominent writer had seen but *two* cases recover from traumatic tetanus. In the case he cited as being unsuccessful, he said the replanted tooth was extracted, and a deposit of lymph or cartilaginous substance had filled the space between the amputated root and the bottom of the socket, and that this jelly-like substance adhered to the root and came away with it when extracted. He believed it to be a deposit from the peridontium, which would in time be organized into cemental tissue. His object in cutting off the end of the root was for the purpose of diminishing that lengthening which replanted teeth are nearly always liable to.

Dr. Buckingham asked the nature of the plasmatic mass at the end of the excised root, spoken of by Dr. Barker.

Dr. Barker replied: It was of the nature of plasma, was of the consistence of and resembled pale currant jelly, afterwards being consolidated into bone.

Dr. Buckingham questioned both the nature of this jelly-like mass (which Dr. Barker said was of the nature of bone), and the advisability of using creasote or carbolic acid solutions. He said a bony deposit could only be formed from the periosteum; this could not be in the case related by Dr. Barker, since he had cut off the end of the root, thereby destroying the bone-forming membrane; and, also, that the surgeon never used carbolic acid on an incised wound, but let such heal by first intention; he (Dr. Buckingham) would merely use warm water. This using of a cautery was not the accepted practice of the day, but was a retrograde step, a falling back to the ancient practice of those who never made a wound without resorting to the actual cautery. He did not favor the operation, as men were like a parcel of sheep following the leader, and liable to run into extremes. He related that a member of the American Dental Association had said (when this same subject was under discussion) that he replanted teeth in cases of *sensitive dentine*, extracting the tooth, filling, and reinserting. He said that when such things were advocated or even admitted by men of standing in the profession, it would exert a pernicious effect on the younger members of the profession, just as the amalgam controversy was doing. He could not say he had been universally successful, like many others, in curing alveolar abscess; he had had many failures; but he thought that in an extremity replantation *might* be resorted to for the cure of *this disease*, when all the other or all ordinary efforts at cure had failed, rather than sacrifice the tooth. He did not think tetanus was induced by the impinging of the dental nerve, for why had Dr. Barker been successful in six cases, and unsuccessful with the seventh case? He thought tetanus was induced by some peculiar condition of the system, and believed the extraction of a tooth was just as apt to produce tetanus as the replantation of one.

A lively discussion ensued between the two, with blackboard delineations, as to how the plasmatic mass (spoken of by Dr. Barker) at the end of the root was formed, and as to its nature, Dr. Buckingham holding to the opinion that it could not be anything like bone; Dr. Barker the reverse.

Dr. Charles Essig favored the use of carbolic acid solutions in cases like those cited by Dr. Barker, and instanced how the general surgeon used these solutions with the atomizer to prevent vibriones from entering wounds, which might produce pyæmia if such were permitted to collect, and that such uses were made of these both in lacerated and incised wounds.

Dr. E. R. Pettit could not see the utility of cutting off the end of the root in the operation of replanting teeth to avoid the lengthening spoken of by Dr. Barker, since the root just fitted the socket, and the cutting off the end did not allow it to be introduced therein any farther thus amputated than entire. Referred to the drainage spoken of by Dr. Barker, and asked how would drainage be obtained in the case of the replanting of a lower tooth?

Dr. Barker would cut off the end of the root to relieve pressure, to prevent impinging on dental nerve, and to secure drainage. He did consider the operation advisable or admissible in lower teeth. He did not regard replanted teeth as foreign bodies.

Dr. Buckingham spoke on vent and vacuum, and could see no difference in cases whether in upper or lower teeth, for drainage could be secured in lower teeth by capillary attraction; as to the vacuum, there could be none, as the socket was filled with blood or a clot as soon as the tooth was removed. In reference to the tooth not being a foreign body, he instanced an operation by two celebrated surgeons where the carotid artery of a calf was severed, and then ligated with a piece of *catgut*, and after some days this was again examined, and the *catgut* was found to be *living tissue*.

Dr. Barker said he did not believe this, although if tissue from an animal recently killed were used as a ligature it might possibly then be changed into living tissue, but thought that the supposed organization was not real, but that absorption and reconstruction could go on; so that apparently the dead tissue was organized, but really it was all absorbed, and a substance resembling it—organized plasma—was deposited in its place. As an example he instanced the well-known popular error of petrified vegetable matter. No such change could occur as conversion of vegetable into mineral, or *vice versa*, except through chemico-physiological laws; but, one atom of the vegetable substance could be dissolved by a solvent, and one atom of a mineral or inorganic substance could be deposited in its place, so that when the interchange ceased a careless person might think the original substance had been changed from organic into inorganic. The subject was then passed.

"Abrasion" was selected for the next evening's discussion.

Adjourned.

CORRECTION.

In the November number of the Dental Cosmos I am represented as saying that "some of the most astonishing shortcomings are excusable in these days of advanced dental science." The meaning of what I did say was this, that some of the most astonishing shortcomings are met with in simple cavities, and are simply *in*excusable, etc.

F. M. Dixon.

CORRESPONDENCE.

To the Editor of the Dental Cosmos.

Sir,—My attention has been directed to a recent number of one of the American dental journals, which I rarely see, and should probably not have seen at present but for the overstrained courtesy of an unknown friend. I refer to "*The Dental Register*, a Monthly Journal devoted to the Interests of the Dental Profession, edited by J. Taft, D.D.S.," October, 1876. Under the general editorial heading are two articles in which my name is made to appear conspicuously. One of these, entitled "Fiat Justitia," takes exception to a statement made by me in the Dental Cosmos for August, 1876, to the effect that "The Code of Ethics of the American Dental Association was compiled, and its adoption secured, chiefly through the labors of Dr. John Allen." If the statement is incorrect, no one could be more willing than I to accept correction. Dr. John Allen has enough and to spare of good repute not to be concerned in the matter. My only animus in mentioning the name of my honored friend was to give credit to one whom I believe to be the author of the Code of Ethics, and whom I know to be a most influential supporter of it. I leave this question to settle itself; it has no further interest for me. As for the part Dr. McQuillen had in the matter (and I crave his indulgence for being thus personal), I remember well his remark on the occasion, to the effect that "those who are imbued with proper sentiments need no Code of Ethics to guide them, while those who are not will defy any Code of Ethics that may be formulated,"—a judgment the soundness of which was very soon demonstrated by a prominent member in a most unblushing manner.

The other and the leading editorial article, entitled "Bad Taste," hardly deserves notice. The paragraph quoted from the DENTAL COSMOS was written without a thought of any personal application. The names "Mad River Valley" and "Thunder and Lightning Hills" were a fortuitous combination. I was hardly aware that there was such a society, certainly could not have told the name of a single member. I have written only in a general sense; individuals who find themselves aggrieved, at the same time that they make their own personal applications, will please consider that, while I extenuate nothing, I set down naught in malice. As to those paltry words, "hired to blackguard a member," "supposed to be dying," I pity the condition of any man who could write them. I have written somewhat for the dental journals, and have received "hire" only on the occasions when, by request of the publisher of the DENTAL COSMOS, I have reported the proceedings of the American Dental Association, of the American Dental Convention, and those of some of the local societies about New York.

Thus we see, Mr. Editor, what the dental profession has to contend with in its efforts to maintain its respectability before the public. I conclude with the repetition of a sentence taken from a former number of the DENTAL COSMOS, which has no less a general application now than when I first wrote it: "There have been, and still are, so many dentists who can claim neither finish of education nor elegance of deportment, that the reproach which they occasion must be borne yet a while longer, until the harvest of their generation shall be gathered in."

I am, sir, your obedient servant,

WM. C. HORNE.

ROME, November 10th, 1876.

EDITORIAL.

THE SITUATION.

THE past year has been prolific of histories. Every day has been an anniversary, and every occasion has brought to the front some industrious writer or speaker, who in his special department of thought or activity has searched the record of the past that the present might be made to shine in contrast. And truly the advances which have been made in multitudinous directions during the century just closed are marvelous. It would seem that there is scarcely anything which has not been improved upon. In general medicine and surgery, and notably in their specialities, the advance has been wonderful. The materia medica has been exceedingly enlarged. Pharmacology has been remodeled. Chemistry has been revolutionized. Physiology has been reconstructed. The systematic labor and experience of the laboratories, the studies, the clinics, and the hospitals of the world have been as systematically recorded, condensed, classified, and made available for the enlightenment of each and all. The knowledge of many pathological processes has been thus vastly increased, and the rationale of the forces to be opposed to such processes made easier of comprehension. Diagnosis and prognosis have been thus simplified, and treatment made more definite and reliable.

What of dentistry and its progress? The changes which have passed during the same period upon its practice are no less notable; indeed, vastly more so than in most departments of art and science. Its colleges, its journals, its societies, are all of modern origin, altogether unknown a hundred years ago; its instruments, appliances, apparatus, materials, and methods are not to be compared, but contrasted, with even the recent past. A different conception, too, obtains of the functions of the dentist. In the past his mission was to remove and substitute; in the present it is to preserve and repair. The question naturally arising from the statement of these facts is, Has success commensurate with the unquestioned advantages alluded to been obtained? In what may be called its art-results there has been such advance that it would seem there is scarcely room for further growth, —the standard of the most accomplished being considered.

But not to discuss the results of special methods, materials, or men, what is the profession at large doing to prevent and arrest the progress of decay in human teeth?

A distinguished physician is credited with the remark, that if all medicine were thrown into the sea it would be all the better for mankind, and all the worse for the fishes. As dentistry is practiced to-day, even including all who are engaged in it, such a remark concerning it might be considered too sweeping; but the aggregate results of practice cannot be said to be satisfactory. Indeed, narrowing our comment to the labors of the most erudite and accomplished operators, we are sure that their efforts, however earnest and conscientious, are often more unsatisfactory to them than to their patients.

It will not, we think, be denied by any observing practitioner whose observation embraces representatives of three or four generations, that from the great-grandparents to their children and their children's children and grandchildren, there is a general continuous deterioration in the quality of the dental outfit through the successive generations. All the facts of professional experience which have been gathered, all the improved modes of practice which the best heads and hearts have thus far developed, have not sufficed to stem the tide which seems destined to render the human race edentulous.

Certainly, if it be claimed that the labor bestowed upon the present generation of mankind by the fifteen thousand or more practitioners of dentistry is in intelligent, successful opposition to morbid tendencies in the masticating apparatus of the race, it would be sad to think of the dire results which would follow its withdrawal. The truth is too patent to be disputed, either "that the means relied upon for the arrest of decay are insufficient for the purpose, or that they are imperfectly applied." A more satisfactory comprehension of the pathology of caries, of the means for its successful prevention or arrest, or more skillful application of existing knowledge, is imperatively demanded.

That dentistry ought to be doing more towards stamping out caries of the teeth than it has done or is doing, will not be controverted. That it may do more in the future than it has in the past, is the desire of all honest hearts; but such a result can come only through an increasing appreciation of the need of something more than manipulative ability; in some profounder grasp of pathological tendencies, and keener insight into remedial possibilities. To earnest, persistent effort for the grand object thus indicated we exhort our readers everywhere, with the hope that the DENTAL COSMOS may in some little degree contribute thereto.

BIBLIOGRAPHICAL.

A MANUAL OF DENTAL ANATOMY, HUMAN AND COMPARATIVE. By CHARLES S. TOMES, M.A. Lindsay & Blakiston, 1876 (American Reprint).

Mr. Tomes, the son of the distinguished author, is very favorably presented to the profession in this volume. A respectful hearing is to be granted him for the name he bears, apart from the decided welcome that he is entitled to for his own sake. The various memoirs upon the development and minute structure of the teeth of mammals, by Mr. Tomes, which have appeared during the last five or six years in the proceedings of the learned societies of Great Britain, have given proof of his earnestness of purpose, industry, and qualification for high order of work. The present volume is in part composed of the results announced in these papers; for the rest, we have descriptions of the human teeth; the development of the jaws; the homologues of the teeth; and accounts of the teeth in the higher quadrupeds.

The first chapter, on the nature of the teeth, and the teeth of man, opens with the following admirable expression of a truth not appreciated as widely as it should be:

"The mucous membrane which lines the alimentary canal is continuous with the external skin, with which it blends at the lips. Now, if a young dog-fish just about to be hatched be examined, it will be found that it has no distinct under lip, but that its skin turns in over its rounded jaw without interruption. The skin outside carries spines (placoid scales), and these spines are continued over that part of it which enters the mouth and bends over the jaws; only they are a little larger in this latter position. If the growth of the dog-fish be followed, these spines of the skin which cover the jaws become developed to a far greater size than those outside, and the identity and continuity of the two becomes to some extent masked. No one can doubt, whether from the comparisons of the adult forms or from a study of the development of the parts, that the teeth of the shark correspond to the teeth of other fish, and these again to those of reptiles and mammals; it may be clearly demonstrated that the teeth of the shark are nothing more than highly-developed spines of skins, and therefore we infer that all teeth bear a similar relation to the skin." "All teeth alike are developed from a part of the mucous membrane, and any connection which they may ultimately get with the bone is a secondary matter."

We are a little disappointed in the account of the human teeth. No attempt is made to explain the variations or deformations of teeth,—dependent as they are upon the application of the principle of evolution, which the author accepts. Thus, while describing at some length the differences between the wisdom-teeth of the white and black races, he has nothing to say with reference to the changes in form which the former variety shows, beyond the well-known features of confluence of the roots and the general diminution in the size of the crown.

The oblique ridge of the grinding surface of the molars is described, and the localization of caries mentioned as affected by the depressions between the cusps.

The section on the anatomy of the maxillæ and their related parts is not, in our judgment, as full as it should be. Many points of interest to dental students are omitted. Thus, nothing is said of the architecture of the facial region, in explanation of the great strength of the nasal processes of the superior maxillæ, or of the weakness of the *canine fossa.* The masticatory muscles, as factors in the changes induced in the shapes of the teeth by trituration, are not mentioned.

The chapter on the dental tissues is, on the other hand, entirely admirable. The author here is thoroughly at home, and presents a capital *résumé* of the histology of the teeth. It would be easy to mark an occasional error of omission, but where so much is excellent we can only commend.

The same conclusion must be formed of the chapter on the development of the teeth, which is undoubtedly the most original in the book. He disputes absolutely the position that the so-called "papillary," "follicular," and "eruptive" stages exist. He informs us that these premises are based upon a false conception, on incorrect theories, and should be abandoned. He follows more intimately, from among many investigations, the teachings of Huxley and Hertwig; the former of whom, as long ago as 1853, exposed the incorrectness of the old views. According to these the tooth-germ consists of two portions, and two only,—the enamel germ and the dentine germ. These are "derived from distinct sources, the former being a special development from the epithelium of the mouth, the latter from the more deeply lying parts of the mucous membrane. Other things, such as a tooth-capsule, may be subsequently and secondarily formed." "The existence of an enamel organ in an early stage is, therefore, perfectly independent of any subsequent formation of enamel by its own conversion into a calcified tissue, for I have shown it is to be found in the germs of teeth which have no enamel; in fact, in all tooth-germs whatever." The author then describes in detail types of tooth-development from conspicuous examples, in animals ranging from the elasmobranchiate fishes to man.

The section on the development of the jaws and eruption of the teeth is singularly unequal. The portions on the eruption and attachment of the teeth are, as the reader may conclude, good. The latter is particularly worthy of notice. Three varieties of attachment are enumerated,—that by means of fibrous membrane, that by anchylosis, and that by implantation in a socket. For the last two a special development is described. In that by anchylosis, the new bone, termed by our author "the bone of attachment," and which is coarser in texture than that of the jaw, is wholly removed by the fall of the tooth. This arrangement is well seen in the serpents. In that by implantation, as seen in mammals, a vascular membrane intervenes between the new bone, and the sockets are plastered, so to speak, round the roots of the teeth.

The imperfections noted as existing, in the remarks on the development of the jaw, we think may be sustained when it is stated that no stress is laid upon the cartilage of Meckel as an important factor. Indeed, the only time we remember having seen allusion to the cartilage, namely, on page 164, is in such connection as to infer that the student is already familiar with it, while its intricate relations to the ossicles of the ear, and the entire visceral arch of which the cartilage of Meckel is a segment, is not even mentioned. The remainder of the book is composed of the descriptions of the teeth of vertebrates. The matter is arranged zoologically, and presents an exact and interesting description of the leading structural peculiarities of the various types. Express attention is given to the comparative anatomy of the milk dentition,—a subject so happily introduced by Professor Flower.

The studies in homology are extended, but not to our mind conclusive. The close adherence to a typical dental formula is not needed by the evolutionist; indeed, the terms are somewhat contradictory. Neither does our author duly appreciate that the homologies of the teeth must be restricted to a single dental arch. The mandibular teeth, or teeth of the lower jaw, form a distinct series,—having eccentric relations only with those of the upper maxillæ.

The author has evidently made this book a labor of love. Every page shows conscientious work,—no slovenliness or haste being anywhere apparent. The knowledge of his subject is comprehensive, and he has used it to advantage. We must also commend the style in which the work is published. The form is that of the Churchill duodecimo, in which so many of the English medical classics have made their appearance. The wood-cuts are numerous, excellent, and, with a comparatively few unimportant exceptions, are original, having been specially executed from original drawings and specimens.—H. A.

A MANUAL OF BANDAGING, adapted for Self-Instruction, with over one hundred illustrations. By C. HENRI LEONARD, M.D. Cloth, 8vo, pp. 132.

THE MULTUM IN PARVO REFERENCE AND DOSE BOOK. By C. HENRI LEONARD, M.D. Cloth, pp. 78.

THE BEST POCKET ANATOMIST (founded upon Gray). By C. HENRI LEONARD, M.D. Pp. 56.

The three little volumes the titles of which we have given above are for sale by J. B. Lippincott & Co. They are good epitomes of the several subjects indicated, and are valuable as ready references.

HOURS WITH JOHN DARBY. By DR. JAMES E. GARRETSON. J. B. Lippincott & Co., Philadelphia, 1877. 12mo, cloth, pp. 250.

Though contrary to a general rule that only books relating directly or indirectly to the theory or practice of medicine or dentistry are noticed in the pages of the DENTAL COSMOS, its readers will doubtless excuse departure from established custom when a contribution to general literature is made by a member of the dental profession.

In previous notices of the miscellaneous writings of Dr. Garretson, attention has been called to their suggestive character. The present volume is still more deserving of such characterization than its predecessors.

Each volume of the author has seemed to have a mission,—unfolding, though under various headings, and associated with miscellaneous philosophy, a single leading idea. The volume before us deals with man's relations to womankind and to home.

In this, as in the previous productions of the author, the philosophy which is generally considered too complex for ordinary comprehension is rendered intelligible in the discussion of human life,—its struggles, doubts, temptations, and consolations,—the author having the happy art of stating his thoughts so as to compel thought by the reader.

The volume bears testimony to meditative thought and careful composition, to a flexile and fertile imagination, to a genial and delicate sentiment, and to a sunny charity.

PUBLISHER'S NOTICE.

THE NEW VOLUME.

This issue introduces the nineteenth volume of the Dental Cosmos.

Succeeding numbers will be issued on the first of each month following.

The improved appearance of the pages in new, clear type will add to the pleasure of their perusal.

The subscription list of the Dental Cosmos is altogether unequaled in the history of any other dental journal ever published. It is now larger than ever before, and its steady increase encourages us in the opinion that it is supplying the wants of the practitioners of dentistry.

We are willing that its probable value in the future shall be estimated by its record in the past.

We send this number to former subscribers, but shall discontinue after this issue unless the subscription is renewed; we request all who desire to subscribe or to renew their subscriptions to do so promptly, that we may determine the size of the edition which will be required.

WE SHALL ADHERE TO THE SYSTEM OF CASH PAYMENT IN ADVANCE.

SAMUEL S. WHITE.

PERISCOPE.

Case of Pyæmia following Dental Caries.—Dental caries—abscess—suppuration in the inferior dental canal—acute periostitis of the lower jaw—extension of the inflammation along the pterygo-maxillary fossa to the orbit—suppuration in both orbits, and osteitis of the vault of the skull—pyæmia. Such is a short summary of this interesting case. Its publication needs no explanation or apology, for such a result from such a cause is probably unknown. I am indebted to my colleague, Mr. Howse, for his ready permission that it should be published.

M. C. W., aged four years and a half, was admitted to Guy's Hospital, under care of Mr. Howse, on September 30th, 1874.

The family history was good, except that there was some account of a tumor in the grandmother. The child had been a healthy boy till six weeks before his admission, when he came home from school with a bad attack of diarrhœa. A few days subsequently he was much frightened by a fire, and it was within a short time of this that his left eye was noticed to swell. In a fortnight the other eye did the same, but no notice was taken of it. He gradually got worse, and for three weeks prior to admission he was in a drowsy state.

On admission, he was delicate and vacant-looking. The left eye was much more prominent than the right, with thickening along the upper margin of the orbit. Beneath the edge, under the eyelid, was a hard, cartilaginous, freely movable body, which reached backwards apparently into the orbital cavity above the eyeball, while it extended downwards into the eyelid. The movements of the eyeballs were perfect, and sight was unaffected. The temperature was 104.5° in the morning, and 102.7° in the evening; pulse 160.

He was seen by Dr. Fagge, who could discover no cause for the elevation of temperature. Dr. Fagge thought, however, that as the roof of each orbit was evidently affected, and the boy tottered as he walked, and was peculiarly torpid, the disease, whatever it was, had extended from the orbital fossæ to the cerebral hemisphere. The ophthalmoscope revealed only large and tortuous veins, with a small hemorrhage on the outer margin of the right optic disc. The temperature remained high, and he rapidly became much worse, losing control over his evacuations, and he died nine days after admission.

Autopsy.—The eyeballs were hardly prominent now, but the left upper lid was full, and a hard, movable mass could be felt along the orbital ridge. The scalp was normal; and nothing wrong was noticed till, on the removal of the vault of the skull, the dura mater in its frontal part and the longitudinal sinus for half its length were rough and of an olive-green color from purulent infiltration of the membrane. The corresponding inner surface of the skull was of the same greenish tint and rough all over, partly from the deposition of a layer of new bone, partly from an irregularly excavating caries. Confining the description still to the bones of the skull, nothing further was noticed till the roof of each orbit had been removed, and then a thick layer of similar green-colored pus was exposed, lying, of course, between the bone and the orbital periosteum. The orbital cavities (muscles, etc.) were quite healthy. On the right side the pus extended all over the outer side forwards, and appeared externally over the superciliary ridge, while it passed backwards through the optic foramen and sphenoidal fissure *underneath* the cavernous sinus, across the sella turcica and grooves for the optic commissure, through the right optic foramen and right sphenoidal fissure,—all this *beneath* the dura mater of the base of the skull, the bone itself being rough and carious, and part of the body of the sphenoid infiltrated with a grumous, chocolate-colored pus. Thus it appeared the right orbit had become affected after the left. On the outer side of the left orbit pus was traced into the spheno-maxillary fossa, and thence to the condyle of the lower jaw. The articulation was free, but the whole of the condyle and much of the ascending ramus on this side was bared of its periosteum, and pus lined the inferior dental canal as far as the first molar tooth, which was decayed, lying loose in its socket, and with carious bone about it. It should also be said that, though the pus so closely surrounded the cavernous sinus on each side, yet these sinuses were quite unobstructed. So also was the longitudinal sinus, though its walls were very much thickened. The frontal sinuses were normal. The lump felt during life over the left superciliary ridge consisted of a tough, opaque, yellow mass, very much like some lymphomata as seen in the neck, or like a gummatous mass. It certainly had all the microscopic appearances of some new growth, but, after further examination, it was evidently of an inflammatory nature. Its precise situation was from the lachrymal gland externally to the inner margin of the orbital ring, and it lay half protruding from and half within the orbit, and adherent to the bone, which on its removal was bare of periosteum.

The brain weighed forty-eight ounces, and lymph was found at its base, and a dot or two of pus was found beneath the arachnoid on the left side, about an inch from the longitudinal fissure. None of the veins contained any coagula. The brain was exceedingly soft, and the number of small cavities formed by softened substance scattered throughout it was remarkable. The whole brain, cerebrum and cerebellum, was studded. Most of them were small,—mere pin-points—but one or two were larger; and they had this peculiarity: that their walls were sufficiently well defined and hard to show that they were not formed by a general softening of the brain, more advanced at some parts than others, but that they were really due to numberless local spots of disease, very probably embolic. Ecchymoses were found in the retinæ, on the pleuræ, and in the substance of the lungs, heart, and kidneys; but no emboli could be found in the vessels. The lungs contained early pyæmic infarcts, and there were early abscesses in the heart and kidneys.

Remarks.—There can be no doubt, from the post-mortem appearances, that the source of all this mischief was a decayed tooth. It had led to caries of the bone, to suppuration in the inferior dental canal, and thence the pus had followed the course which has been described. The case is one perhaps rather curious than instructive, though as a record of a bare possibility it is worth remembering. It is a good illustration of the bad results which may follow a slight amount of mischief in an unhealthy subject, and is remarkable in that there is no history of any toothache, swelling, or other trouble about the jaws. Excepting a bad attack of diarrhœa, the first symptom noticed was swelling, first of one eye, and then of the other. Notwithstanding that by the time the second eye was affected, as shown by the inspection, there must have been considerable suppuration at the base of the skull, about the pituitary fossa, and very probably about the vault also, the disease at its onset must have been peculiarly insidious, and the pyæmia of late accession, within a few days of his admission. The case has several points of pathological interest; chief of these seems to be the occurrence of chronic inflammatory tumors, such as those in the orbital fossæ, and not abscesses, though they were directly continuous with the suppurating surfaces of the base and vault of the skull. Pus so commonly begets pus. It is not, however, always so. One occasionally finds in the lung, in cases of pyæmia of somewhat more chronic form than usual, indurated spots of chronic inflammation evidently produced in the same way as the—it may be quite adjacent—abscesses. In one instance, in a very chronic case of pyæmia after amputation of the leg, the extension of gray tubercle round the central inflammation was seen. Such cases depend upon some peculiarity in the infective material, or upon defective reaction on the part of the infected tissue, which in turn must, of course, depend upon the state of the body as a whole. Experiments on animals have shown that by varying the strength of the infecting agent, the form—or, perhaps more correctly, the degree—of cell-growth can be made to vary from abscess to tubercle. In this case, however, it was probably no dilution of the poison which led to the orbital tumors; but the whole history shows that the infected tissues were most tolerant, and not easily excited. Had it been otherwise it would have been impossible that such an amount of disease could have existed. In the case of chronic pyæmia, just referred to, the patient had lost so much blood from a uterine fibroid tumor that her leg became gangrenous from the extreme feebleness of the outlying parts of the circulation, and weeks after the amputation which this condition necessitated she died. Is this not always so in chronic pyæmia? It occurs in enfeebled patients whose tissues are in so quiet a state—*i.e.*, so accurately supplied with just the requisite amount of nutriment and energy—that they can hold their own, and no more. In such a condition, where is the blood to produce inflammatory congestions? and the tissue elements have not got it in them to multiply and make mischief. So the wandering cells are few in number; they meet with no response in their lawless excursions and indurations, and organizing products result in place of abscesses. The practical point which such cases teach is this, that chronic pyæmia is one stage nearer no pyæmia at all than the local outburst in the more rapidly fatal forms. If it is chronic because, as has been said, supply and demand happen to be adjusted for maintenance only, and not for growth, how pertinent in its suggestions is the process on the treatment of inflammation in general! But, as if to contradict what has been said with regard to the relation between the orbital swellings and the pus elsewhere, the patient in question ultimately died with high fever and apparently acute pyæmia. Well, "the worm will turn," it is said, and possibly some very fetid change may have occurred in the dental abscess, and thence have been propagated to other parts in the last few days of life. Such a view is quite in accord with the bacterial origin of pyæmia, which obtains so much credit at present. This much, however, seems certain, that the local inflammations which caused the patient's death, and those which were noticed first some time before death, were of different dates. Between the two the condition of the patient had been altered, both as to his surroundings and his diet, and quite possibly—though advantageously to the vigor of his tissues individually—not altogether to the continuance of life, so far as it was threatened by pyæmia. The logical conclusion of these thoughts is not, as some may think, that patients suffering from any of the various inflammatory diseases are to be starved and bled, and reduced to the lowest possible ebb. They only suggest caution. It is possible to do too much. Pyæmic cases, for instance, particularly, are often stuffed merely by routine. Is it always good for such cases that they should be so? It is probable that Sir James Paget's advice with regard to reduced supplies in carbuncle might with advantage be applied to many other forms of disease, both in medical and surgical practice.—*Dr. James F. Goodheart, in Medical Times and Gazette.*

GROWTH OF A DOUBTFUL CHARACTER UPON THE GUMS OF A CHILD.—The regular paper for the evening was read by Dr. S. H. Durgin, as follows:

D. A. was a well-developed, healthy female child, born in March, 1874, of healthy American parents. The father had been a widower, the mother a widow, and each had lost an only child. The child of the former died from some disease of the spine when about ten months old. That of the latter died from cholera infantum when six months old. This is the first and only child of the present marriage, the father being about fifty and the mother about thirty-four years of age.

At the birth of this child the mother had no milk for it, and condensed milk was substituted. It nourished and grew well on this food for nine or ten months, when groats and occasionally meat-juice were added. The first summer was passed without serious illness. Diarrhœa occurred now and then, but was never obstinate.

In December, when the child was nine months old, and after the gums had twice been divided with the lancet to relieve the congestion, the two upper central incisor teeth came through. The corresponding under incisors appeared about a month later, when the four teeth and the gums looked perfectly healthy in all respects. Very soon after the appearance of the two under central incisors, the gums about the upper ones assumed an unnaturally red and slightly swollen appearance, then a very dark purple spot came upon the labial portion of the gum above one of the upper central incisors, which gradually spread over both gums, extending laterally somewhat beyond them on either side. At the end of two months this unnatural gum had so increased in size that the labial and lingual portions met at the ends of the two upper incisor teeth, completely hiding the latter from view. The tumefaction at this time was from one to two lines in thickness, or at least three times the ordinary thickness of healthy gums. It presented a smooth, dark surface, had an elastic and moderately firm feel, and was not particularly tender. The growth appeared upon the lower gums later, and was neither as large in size nor as dark in color as that upon the upper ones. There was no bleeding of the gums upon pressure, and no tendency to hemorrhage in any part. Tenderness was not marked until after the gums had extended below the ends of the upper incisors, when they became subject to frequent irritation by exposure to the air, and by contact with the nursing-bottle and whatever else the child might put into its mouth. Crying caused the tumefaction to increase very little in size and to look tense and darker in color.

During the first two months of this singular appearance of the gums, and while the child appeared to be well nourished, no treatment was resorted to except the local application of astringents. The frequent use of a strong solution of tannin in glycerin, of carbolic acid in glycerin, or of persulphate of iron, applied with a camel's-hair brush several times daily, caused a moderate shrinking in size and a lighter color for a few days, and then the growth suddenly resumed its ugly appearance.

During the next month, March, the child was more fretful, did not thrive as before, and its flesh was not so hard or its color so good. The condition of the gums did not change materially. The applications to the gums were occasionally made for a few days at a time, and cod-liver oil and tincture of iron, a teaspoonful of the former to four drops of the latter, were given three times daily, and the child was taken out-of-doors every day when the weather would permit.

During the fourth month there was no increase, but possibly a decrease in the size of the gums, with a paler hue and less firmness to the touch. The same treatment was pursued, with an additional amount of out-door air and more meat-juice in the food.

About the end of the fourth month the child, while playing with a button-hook, accidentally tore away a portion of the gum from one of the upper teeth. The bleeding was profuse for a few moments, but stopped without interference. Carbolic acid and glycerin were applied with the brush twice a day for two or three days, when a marked improvement began and went on rapidly, and in about three weeks the gums were all in a perfectly natural condition.

In the early part of February, or about two weeks after this abnormal condition of the gums was seen, the child, having been active in the use of its limbs, standing with slight support, suddenly gave up all use of her legs, and in a great measure that of her arms. She could bear no weight upon the legs, and the least movement of them gave pain. She would sit quietly without apparent discomfort, and occasionally pick up and handle a toy. There was no tenderness to be found about the spine, and none could be detected about the hip-joints.

Special tenderness could not be located anywhere, yet the child did not like to be moved and was not inclined to move herself. This condition lasted about three months, and then gradually improved. The child walked when eighteen months old, had eight front teeth, and was in all respects healthy. She is now two and a half years old, has all her milk-teeth, weighs thirty-five pounds, and is well.

In answer to the inquiry of Dr. C. P. Putnam regarding the nature of the growth, Dr. Durgin replied that he, as well as others, was unable to give any positive diagnosis of the affection.

Dr. Ingalls, who saw the case with Dr. Durgin, said he had consulted a number of authorities, but had found the literature of the diseases of the gums very meager. In the case reported, the discoloration and moderate tumefaction rendered it certainly a curiosity. It did not, when he saw it, resemble a fungus or a nævus; it was hard to the touch and did not bleed readily, and what hemorrhage there was ceased spontaneously. The fact of the child's losing the use of its limbs was a peculiar feature. Whether the two affections were connected or not he was unable to say.

Dr. Fifield remarked that he had seen an affection in the adult resembling this, which seemed to be an hypertrophy depending upon an inflammatory condition of the periosteum, combined with caries. He differed from those who thought it to be of a malignant character. —*Proceedings of the Boston Society for Medical Observation, in Boston Medical and Surgical Journal.*

THE TREATMENT OF RANULA.—The Paris correspondent of the *British Medical Journal* writes:

Ranula is admitted by all surgeons to be a most troublesome, and in many cases a most intractable, affection. It is sometimes so little amenable to treatment, that some surgeons, and among them the celebrated Dupuytren, contrived different means by which to keep open a fistulous orifice in the tumor, in order to empty the contents of the latter in the mouth. Jobert de Lamballe endeavored to effect the same object by inverting a portion of the internal surface of the ranula, and uniting it by a suture with the mucous membrane surrounding the orifice. M. Panas, of the Lariboisière Hospital, finding these methods of treatment unsatisfactory, and after having given a fair trial to the different remedies in vogue for the cure of this affection with equal unsuccess, has lately resorted to the practice of injecting these tumors with a solution (one to ten parts) of the chloride of zinc, the results of which are most encouraging. M. Panas injects into the tumor from three or four to eight or ten drops of this solution, which also varies in strength according to the age of the patient, and this he does with a hypodermic syringe.

On the same subject, Mr. T. H. Morton, of Sheffield, adds:

I might observe, without entering into the morbid conditions leading to obstruction of a sublingual gland or duct, that, practically, the surgeon's intention is to make a permanent opening in the sac, one which will allow the saliva continuous and natural exit into the mouth. It occurred to me some years ago, that the use of a metallic seton, acting, to some extent, as a drainage-tube, would attain this object; and as two cases (both children) came under my notice, I tried the following operation. An ordinary suture-needle, carrying medium-sized silver wire, having been passed directly through the sac-like tumor from one side to the other, the ends of the wire were brought forward, twisted together, and cut off, leaving a small ring of metal half within and half externally. The wire was allowed to remain three weeks, then cut and withdrawn. It caused no irritation or impediment, and a patent orifice remained after removal. Both cases were permanently cured. The ordinary seton, made of silk or hemp, necessarily sets up inflammation, and may induce subsequent closure or fistulous aperture. Injection of caustic fluids, as chloride of zinc, in ranula, is open to objection, as destruction of tissues is not desirable, at least in simple cases of obstruction. The plan I suggest is worthy of extensive trial, as it promises to supersede those hitherto adopted.—*The Medical and Surgical Reporter.*

DISEASE OF THE TONGUE APPARENTLY CAUSED BY THE PRESENCE OF LEPTOTHRIX BUCCALIS.—Ubisch (*Centralbl. f. Med.*, 1876, p. 312; from *Berlin. Klin. Wochenschr.*) had as a patient a man thirty years of age, an inveterate tobacco-smoker, whose tongue had become gradually enlarged and thickened until it gave pain on motion and interfered with phonation. His appetite and digestion were good. Examination showed the tongue wider and thicker as well as of more firm consistency than the normal. The whole surface was covered with a tenacious, shining, opalescent coating, thin towards the tip of the tongue, but growing thicker posteriorly, so that the circumvallate papillæ and glands seemed imbedded in it. The under side of the tongue was covered with a similar coating, but the sides were free.

The gums, palate, tonsils, etc., were quite normal. The coating could not be entirely removed, but seemed imbedded in the tissues. Microscopic examination showed the coating to be one mass of leptothrix.

The remedies indicated were parasiticides. The surface of the tongue was rubbed with a three per cent. solution of carbolic acid, and the mouth was frequently rinsed out with a weaker solution of the same. In a few weeks the entire coating had disappeared, the thickening of the tongue had diminished almost or entirely to the normal, and every movement could be made without pain or annoyance.—X, *in Philadelphia Medical Times.*

SALICYLIC ACID.—In a paper reprinted from the Transactions of the Maine Medical Association, Dr. F. H. Gerrish, of Portland, gives the experience of sixteen Maine physicians with salicylic acid. His conclusions are that we have enough evidence to warrant us in believing that we have in salicylic acid an agent which promises so well in certain directions as to make it desirable for us to industriously prosecute our researches into its action in health and disease, and this with a reasonable hope that it will in time be accorded an honorable position in our materia medica. It has been most extensively and satisfactorily used in rheumatism, especially in the acute form of the disease, and its administration has been followed by relief in various rheumatoid affections. Its resemblance in certain of its physiological effects to quinia, and its apparent control over inflammation in some cases, encourage us to expect decided advantage from its use as an antipyretic. There is yet much disagreement as to its value as a topical application, though it is conceded by nearly all that it is very useful as a deodorant.—*Medical and Surgical Reporter.*

ANTIDOTE FOR CARBOLIC ACID.—As this acid is now so extensively used, it may be of some importance to make known the antidotes which have been proposed. M. Ferrand advises the following:—White sugar, fifteen parts; water, forty parts; quicklime, five parts—forming a saccharate of lime.—*Medical and Surgical Reporter.*

DEATHS FROM CHLOROFORM.—The *Ohio Medical Recorder* for October, 1876, reports a case of death from the inhalation of chloroform occurring in a young woman aged 30, to whom it was administered for the extraction of a tooth.

Another case is reported in the *Pacific Medical and Surgical Journal* for the same month. The patient was a man who resided in Madison County, Indiana, and the anæsthetic was administered for the purpose of extracting a thorn from his foot.—*Medical News and Library.*

HINTS AND QUERIES.

WILL the editor of the DENTAL COSMOS, or some of his many correspondents, give a country practitioner some data for the understanding and treatment of caries of the jaw? and thus oblige INQUIRER.

A GENTLEMAN has just applied to your correspondent for treatment of a growth or swelling lying beneath his tongue; it is of four months' standing, and is soft and fluctuating. Any hints will be gratefully received.—OHIO.

WILL some one who has had experience tell me the cause of "sore mouths" in connection with the wearing of rubber plates, and the remedy? The class of cases to which I refer exhibit a general inflammatory condition of the mucous membrane under the plate, associated not unfrequently with the formation of small pustules.—S. F. G.

CAN some one tell the cause of rubber shrinking away from teeth while being vulcanized? I use whalebone, and often find this shrinkage around one or two teeth out of a set. What surprises me is that it does not shrink from them all as well as from one or two. I have seen a piece taken from the flask with a tooth quite loose. If any one will tell how to prevent this he will greatly oblige a STUDENT.

WHAT, in the American system of numbering microscopical objectives, are the terms "one inch objective," "one-eighth objective," etc., based upon? Or, why are they "one inch" or "one-eighth," etc.? The only definition I have yet had is that the terms are derived from the distance the objective must be from the slide. —W. E. DRISCOLL.

CAN some one, who has had experience, tell me how to bleach a tooth whose nerve has been destroyed by the use of arsenic, thereby changing its color to a dark purple? I have tried the solution of chloride of soda and chloride of lime, but to no purpose.—C. T.

I WOULD like to be informed what change takes place in nitrous oxide gas from being kept a few days, rendering it inert.—A. B.

WILL some reader of the DENTAL COSMOS inform me *when*, *how*, and *why* salicylic acid is used in dentistry?—PENN.

WHY do some gold fillings turn dark, almost black, and what is the remedy? We have seen a number of first-class operations that had become discolored, and could not give any reason for it.—WHY.

WILL some one give us the best cement in use for mending broken plaster models?—J. W. W.

CAN any one inform me of a case in which a charge by a dentist for lost time, in the failure of a patient to keep an appointment, has been collected by process of law? and if so, is the decision of record?—C. F. W.

WILL somebody inform me what can be done with zinc for metal dies when it becomes porous? Can it be restored so as to be used again?—G. E. A.

A CURIOSITY of nature—a singular fact, and one worthy of being recorded as of interest to the profession—came under my immediate notice on the 28th ult. Isaac Woodruff, in the employ of the Chicago, Milwaukee and St. Paul Railroad, called to have an examination made of his teeth, when I learned the curious fact that he has a fully-developed tooth, having very much the appearance of a bicuspid, firmly imbedded in the roof of the mouth, a little to the left of the median line. Mr. Woodruff is forty-two years old, and informs me that the tooth made its appearance in his twenty-second year. As the patient has no third molar on the right side, I am disposed to think this is the missing tooth.

I would like to have an expression of opinion as to the probable correctness of this theory, and the probable or possible result of extraction.—D. RICHEY, *Milwaukee.*

REPLY TO ONE POINT OF GEORGE DILLON'S QUERY.—To have assurance of correct relation of the lower articulating wax to the upper it is only necessary, after the proper length has been secured, to direct the patient to perform the act of deglutition, the head at the time being thrown well back. As at the moment of the elevation of the larynx it is impossible to assume any other than a correct position of the parts, it will be seen this method offers a sure means of making true adjustments.—L. J., *Philadelphia.*

OXYCHLORIDE OF ZINC (*so called*).—While I thank Professor Essig for the information contained in his chemical criticism of the term "Hydrated Oxychloride of Zinc," I would again state that it was merely an "acceptance" on my part, which, from the very manner in which I presented it, indicated that I did not indorse it as correct nomenclature.

The modification was mentioned to me in this phraseology; and, recognizing that it would no more bear criticism than would the designation "oxychloride of zinc" itself, I *gave my reason for its acceptance*, which I am pleased to notice is confirmed by the perfectly correct idea of my meaning, which is stated to be "apparent."

I am surprised at the strength of "solution of chloride," which is given by Prof. Essig as "ordinary," for I am inclined to think that analysis will show the *usual* strength to be *very much* in excess of those proportions.—J. FOSTER FLAGG.

AN INSTANCE FOR DR. C. E. FRANCIS.—Patient over fifty years of age. By kick of a horse lost the crown of left inferior second molar tooth. The roots were left disjointed, and protruding just above the level of the gum, in a jagged condition. The nerve-canals were filled with os-artificiel, and a crown was packed and shaped upon the separated roots with amalgam, so as to bind them together in union. After two years' service, the patient calls it "a lasting monument to success."—B. H. TEAGUE, *Aiken, S. C.*

ALLEN'S CONTINUOUS GUM.—Twenty-five years' use of this work warrants the assertion that in the hands of the true artist it is unequaled as a base for artificial teeth, fulfilling all the requirements and producing an absolutely perfect imitation of nature, and is a mode of inserting artificial teeth against which no possible valid objection can be brought.

There is, however, one objection urged against its use, that of *weight.* This is a most frivolous one, and one which no experienced dentist, it seems to me, can honestly entertain; for if a set of teeth is fitted to the mouth and properly adjusted in all respects, the patient never realizes weight. This I have tested in a multitude of cases by replacing rubber with continuous gum, and never yet found a patient who could tell any difference in weight. Often have I asked patients who have worn the work for many years, "Do you not find it heavy?" and the answer is, "No." A lady who had been wearing a rubber set for a number of years, said she thought it was heavy, and asked if it could not be made lighter.

I told her it was not from its weight, but from the fact that it was constantly dropping, that she had obtained the idea of weight. I made her a set of continuous gum, and she has never found that too heavy.

Now, what are the advantages of the continuous gum? Beginning with the plate, we find that platina is the purest metal or material that is used for plates, producing no unpleasant effects upon the mucous membrane; and being a conductor of heat, we find none of the effects so commonly resulting from the use of the vegetable bases, like rubber and celluloid.

Then by this method the teeth are arranged individually and fastened securely to the plate, and we know thus far that the plate and teeth are just as we wish them. Then comes the gum, and we all know that the porcelain gum is the only natural imitation of nature. There are numerous cases of prominent alveolus and short upper lips where the gum shows very high, and it must at the same time be very thin; there is *nothing else* will meet the requirements of these cases but continuous gum, for here the gum can be as thin as need be and still be strong, because it is baked to the plate.

Then in this work the palate is made to resemble exactly the natural palate, both in appearance and touch to the tongue. A public speaker can speak with greater ease with such a plate than with any other kind.

Finally, when made as it should be, with *continuous lining* to the teeth, with foot-piece well soldered to the plate, with binding of flattened wire on the upper margin of plate, and double neatly soldered to the heel of plate, we have the *strongest* work ever made.

I can say that I get up a case of this work with more assurance of success in all respects than with any other method I ever used, and for twelve years I manufactured and mounted block-teeth with as great a degree of success as any one. But in this work the true artist has room for a display of taste and skill nowhere else to be found, and I cannot see how any dentist can dispense with it, for in the class of cases mentioned above it is absolutely indispensable to any one who has ever used it. I should rejoice to see it introduced into the practice of every reputable, progressive dentist in the land.

I want to close with a word for Dr. John Allen. I consider his method of inserting artificial teeth as the only real advance made within the last thirty years. —L. P. HASKELL, *Chicago.*

ARTICLE V. (Adopted by the Michigan Dental Association March 30th, 1876.)—As the diploma of a legally authorized dental college, or a university having a dental department, is the only formal voucher which furnishes to the community presumptive evidence of the professional acquirements and abilities of the dentist, so the possession of such diploma authorizes its holder to affix the title of "Doctor" to his name. It is therefore in accordance with etiquette to use this title when addressing such graduate, and equally in *bad taste* to use it in connection with the name of any one who does not *legally* possess it; and as such indiscriminate use of the title tends to depreciate its value, it should be carefully avoided.

But as the annals of our profession contain the names of many who, though not having had the advantages of a collegiate education, have nevertheless become, through their own exertions and abilities, brilliant scholars and successful practitioners, therefore one who enjoys a good moral and professional standing in the community, though not a graduate, should not be excluded from fellowship, but all honors, respect, and consideration usually accorded to professional curists should be freely given him, *except the graduation title.*

THE

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 7.)

THESE nodules may exist to very great extent and yet give rise to no inconvenience; but when the temperamental and constitutional concomitants are such as to make of them a cause for irritation, we shall then find it expressed in all grades of violence.

The symptoms of the existence of pulp-nodules are: continued or intermittent pain, increasing in violence with the progress of the disease, until it becomes unendurable; *sometimes slight external inflammation* (indicated by change in gum-color and some pain from striking upon tooth), but most frequently none whatever; a *peculiar sensitiveness* of enamel in response to scratching upon the tooth with the finger-nail, and sometimes even from the mere touch of the finger; exquisite sensibility of dentine (in painful cases), *increasing upon cutting or drilling;* exquisite pain from pressure upon the pulp *after it is exposed by drilling;* so much more than ordinarily occurs as to agonize upon the slightest touch, thus precluding any other than the most gently-made direct applications, even for obtunding the sensibility or destroying the vitality of the pulp,—forming altogether what I may safely state to be by far the most painful condition incident exclusively to a tooth that the dentist is ever called upon to treat, and that one which requires the most patience, the most delicate manipulation, and at the same time the most decisive and thoroughly consecutive treatment for the *usual* attainment of a satisfactory result.

It is from the *symptoms* alone that the diagnosis of pulp-nodules can even be guessed at, for it would seem that "signs" are no guides whatever.

Some of the teeth which are found to be the seat of exceedingly severe and long-continued pain are, to all appearances (even after extraction), *perfectly sound.* Others are slightly decayed; but so slightly, and in such positions, as to preclude the reasonable probability of such decay being an irritating cause, even for the original inception of nodular calcification. Others are very extensively decayed, and yet present few of the ordinary symptoms of "deep decay," and only now commence developing the *peculiar* symptoms of the real cause of trouble. And still again, others will permit, by progressive decay, the trifling degree of pulp-irritation which will sometimes eventuate in death of that organ without absolute exposure, subsequent to which the usual quiet will supervene; and it is not until years after, when the pulp-cavity is opened and explored for the relief of peridental irritation (possibly alveolar abscess) from pulp putrescence, that the existence of numerous or extensive pulp-nodules is discovered.

Thus, while it might be presumptuous to assert that caries and nodular calcification of the pulp never have the significance of relation, I may yet state that, so far as I have observed, I have not in any case been able to note the connection.

Treatment.—As years have passed, and cases have multiplied, and *results* of former experiences have been tested by time, and many things which I formerly regarded as true have been proven to my satisfaction to be fallacious, the treatment which I gave for this condition some sixteen years ago has become susceptible of marked modification.

I have found, in the aggregate, that the treatment of such cases of nodular calcification as have merely the presence of nodules, without any of the *peculiar* phases of irritation which have been given as their possibilities, is in no wise distinguishable from *routine* pulp-cavity work (so to speak), with the simple exception of the mechanical difference of the extraction of the nodules.

The present appliances of the dental engine, with the varied form of bits, the *pull* and push capability of the hand-piece, and the admirable right angle and acute angle "lock-bit attachments," have so far simplified the mere manipulative considerations of this formerly difficult operation, that the exhausting labor of yore *ought* to be a thing unknown to the present generation of both operators and patients, and only remembered by older dentists and patients as an infliction from which they are now mercifully exempt.

But it is in cases where we find the different grades of suffering which nodular irritants *do* inflict that, just in proportion to their severity, we still find (as I have intimated) a difficult, and frequently prolonged, treatment necessary to the final attainment of a *comfortable* and *permanent relief.*

I desire, at this time, to have it *definitely understood* that the fact of so large a range of possibilities in connection with the presence of pulp-nodules entails upon the practitioner a constant remembrance of the statements given, in order that the discovery of a pulp-cavity full of nodules, without any concomitant suffering traceable to them, may not occasion surprise; while, on the other hand, the final discovery of one small pulp-nodule, encountered during the process of devitalizing and extirpating a dental pulp, may give reasonable assurance of the cure of long-continued, severe, and variously-treated suffering.

Thus it is, also, that in some of these cases the most ordinary practice for pulp devitalization will suffice for the easy attainment of the desired relief; while, again, the most careful, judicious, patient, or decisive treatment which the experience of our best dental therapeutists dictates is *utterly futile*, only resulting in continuous, or at best slightly intermittent, suffering, and eventuating in the loss of the tooth. Nor is this all, for it is sometimes the case that the irritation *due to treatment* will so firmly establish the *habit of disease* that it becomes one cause of "phantom" odontalgia, which will occur at intervals for many, many years after the extraction of the tooth, during the paroxysms of which it seems as though the tooth, so long since lost, *must* again be present.

In cases of this kind, where artificial teeth have been substituted, it is indeed remarkable with what accuracy it *seems to the patient as though the same scratching or drilling of the porcelain tooth* would inevitably result in the well-remembered peculiar sensations or direful inflictions of former years.

When, by differential diagnosis, one has decided upon the probability of nodular irritation, and has also ascribed to a given tooth the probable location of the immediate trouble, I should suggest as advisable for preliminary treatment the administration of *assafœtida*, in pill form, and *meconate of morphia*, in solution, together with the local application of the ointment of *aconitia* (aconitia, gr. ij; simple cerate, ʒj), followed by the ointment of *veratria* (veratria, ℈j; simple cerate, ʒj), *in portions not larger than an ordinary bead.*

These ointments should be rubbed gently with the tip of the finger over the eyes (supra-orbital foramen), upon the temples, upon the sides of the nose, and upon the cheeks (about and below the infra-orbital foramen).

Particular directions should be given the patient in regard to the danger of getting the ointment into the eyes, as the veratria particularly is excessively irritating; *and the applications should always be made by the operator, never giving patients such prescriptions, or trusting to their use of such potent medicaments.*

The usual result of one or two days' medication and application of ointments is quite marked alleviation of suffering, especially of the facial trouble and general irritability consequent upon long-continued pain.

I should remark that in my experience *sedative* rather than stimulating or strengthening (medicinal) general treatment seems, almost universally, to produce the happiest results; *especially are quinine or preparations of Peruvian bark contraindicated.*

I mention this because in *general* nervous irritability and *spinal* neuralgia such excellent reports are given of the action of these famous medicines, that they are naturally resorted to in lesions of the *fifth pair;* but in these cases the testimony of benefit is quite exceptional, *while that of aggravation, even, is not unusual.*

Having obtained comparative comfort, and recognizing the ephemeral character of the relief, the attempt to reach the pulp should be made without delay.

Should a cavity of decay exist in a position affording easy access to the pulp-cavity, the attempt would naturally be made through that avenue; but should the cavity of decay be so situated that full and free ingress to the pulp-cavity would be difficult, it should then only be utilized as the medium for such applications as would first obtund the sensibility and allay the irritability of the pulp, and thus prepare it for a less painful devitalization.

As a pain-obtunding application, I have never found anything superior to the acetate of morphia, in combination with creasote, oily carbolic acid, or oil of cloves; and as a devitalizer, the cobalt paste, or the ordinary arsenious acid paste, will usually suffice to attain the desired object. I say *usually*, for it is sometimes the case that these agents are perfectly inert.

I have had cases in which, to test this thoroughly, I have gained the consent of patients to suffer for several weeks, during which time both cobalt and arsenious acid were employed by repeated applications and by previous allaying of irritation, without any appreciable arsenical impression.

The prognosis of such cases is unfavorable, and my experience has been, that though *comparative comfort* may be obtained by other means (to be referred to), such comfort is not satisfactory, and is sometimes of but short duration, even such as it is.

When no cavity of decay exists, that position is chosen in any tooth which will provide the most accessible route for a complete entrance into the pulp-cavity by drilling. This matter will be fully discussed in connection with pulp extirpation.

As I have said, such drilling is painful in exact ratio to the sensitiveness of the tooth, and usually demands some of the methods for the obtunding of "sensitive dentine" which have been given under that head. It will, however, be noted that such precautions as were given in regard to medicaments dangerous to pulp vitality would now be instructive as indicative of their *utility.* We therefore use deliquesced chloride of zinc or chromic acid for immediate obtunding, choosing the one which upon trial is found to be either the more effective or the less painful, or both; while for a more slowly acting, though usually more comfortably efficacious, application we employ the arsenical paste so soon as we have obtained a drill-pit of sufficient depth to permit of the secure retention of the medicament. Any drilling by such means as have been given, is sometimes found intolerable, and it is in these cases that I have never, as yet, had the application of *electricity* fail me.

NOTE.—In consequence of the reception of several communications, and the expression of several verbal reports, in relation to the inefficiency of this agent, I desire to call especial attention to the accurate manner in which I have stated its capability. Correspondents and inquirers seem surprised that it does not *entirely obtund sensation* and render very painful operations *completely painless.* This I have *never stated* to be the case.

It is true that I have repeatedly prepared *comfortably* cavities in teeth which had been found by others, as well as by myself, to respond very severely to chloride of zinc, and in such positions (close to and under the gum) and in such tissue (very soft and horny) as to render it improper to employ chromic acid; but these were not so *exquisitely* sensitive that I regarded them as *exponents* of the power of electricity.

In such *dreadfully painful* operations as are found to be either perfectly demoralizing or utterly intolerable, electricity has been proven by others beside myself to be that agent which renders these *possible and endurable.*

The terms which I have used when speaking of these results are: "the affording of great relief," "able to endure," "alleviating pain," "comparative comfort," and the like, and this I insist upon as true.

When this is not accomplished, it is either that the patient is not amenable to the beneficial application of electricity *as an anæsthetic* (six in one hundred); or that the appliance used is not a proper one; or, lastly, *that the application is not properly made.*

I have so frequently illustrated the pain-obtunding power of electricity *that it seems to me* strange that further demonstration should be needed; but, recognizing that I possess a familiarity with this agent and its media for application, engendered by the experience of fifteen years, it will not be regarded as impossible that it may do more for me than it would for a novice.

It is for this reason that I have given so minutely those methods for its employment which it has required years of experiment to develop, and which, I am persuaded, will reward with success the endeavors of all who are determined to try patiently and persistently until they are able to utilize in their practice this great boon to humanity.

Usually, when *electricity* is employed, it is possible to drill, without too much suffering, until a complete, or almost complete, exposure of the pulp is made; but I have found that it is unwise to risk any unnecessary irritation, either instrumental or medicinal; and for this reason it is better to approach only as near to the pulp as is possible without wounding it.

Having reached this point, the first applications, like those which have been directed in cases of existent cavities of decay (acetate of morphia pastes), should be made with the view to allay pulp-irritation; should these be successful, they should be followed promptly with cobalt or arsenious acid, which, if it acts favorably, should be allowed to remain for at least three or four days, unless the *nodular irritation* becomes again severe, in which case the application may be sooner removed, and its effect in the devitalization of dentine, and upon the exterior of the bulbous portion of the pulp, be ascertained.

Should a large nodule or nodules exist in the bulbous portion of the pulp, it will oftentimes be a mechanical preventive to the desired effect of the devitalizing agent, which, being able to act sufficiently only upon the periphery of pulp-structures, will leave that portion which is impinged upon by the nodule still so sensitive as to preclude its removal without the infliction of unnecessary suffering. Under such circumstances an effort should be made to enlarge as much as possible the exposure of the pulp. This should be done with exceeding care, avoiding pressure upon the nodule, if this induces pain, and only with the view of repeating the arsenical application; which should again be left for three or four days, unless, as in the first instance, the original cause of trouble should inflict too much pain.

As soon as it is found possible to remove a nodule without any, or with but very little, inconvenience to the patient, it should be done. This it is best to do either with a tempered "nerve-hook" of average size, or with a straight drill-pointed instrument of delicate make, yet sufficient strength. When this has been accomplished, a further allaying of irritation should be the next consideration, followed in turn by consecutive devitalization, *if indicated.*

At this stage of the treatment of a *troublesome* tooth of this kind we have arrived at that point where it is very difficult to so generalize, as to direct *definitely* the best course to pursue.

It must be conceded that a combination of judgment and experience can alone direct to a successful termination, and it must be remembered that even these sometimes fail most ingloriously. With this concession and remembrance, much may, however, be added to the chances for success by endeavoring to recognize clearly the *principle* which underlies our efforts. This principle is, a steady advance, with the least possible irritation.

(To be continued.)

RESTORATION OF CONTOUR VS. PERMANENT SEPARATION.—REPLY TO DR. CHUPEIN.

BY MARSHALL H. WEBB, D.D.S., LANCASTER, PA.

In "Remarks on Operative Dentistry," published in the DENTAL COSMOS for May, 1876, Dr. Chupein propounds the question, "Is the juxtaposition of gold next to gold superior to enamel next to enamel? or is the tooth rendered in a better condition after fillings of this kind (contour) are inserted than when the teeth were intact?" My reply was that "they are, for the reason that when the cavity is prepared, filled, and the filling finished, as set forth in the article on 'Operative Dentistry,' to which the doctor refers, the gold only being in contact with gold, and the margins of enamel free, this very freedom of these margins enables the oral fluid (which is kept in almost constant motion by the action of the tongue, lips, and cheeks) to keep such margins quite clean, even without the use of the brush, floss-silk, and tooth-pick." After the publication of this "Reply" in the July number of the DENTAL COSMOS, I thought that Dr. Chupein might possibly misunderstand me, and the supposition has proven true. In the statements referred to I presumed that all would understand that the "juxtaposition of gold next to gold is superior to enamel next to enamel," and that teeth are in a "better condition" when the contour has been restored in as perfect a manner as possible, and the margins of enamel are made free, *only so far as a recurrence of decay at or about the point or part in contact is concerned.*

Dr. Chupein has misapprehended several statements, and has not, therefore, referred to a number of points in such terms as to convey the exact idea intended. In making quotations, he should also give the prelude and the sequel. When I stated that "disintegration of the enamel may be prevented by polishing the proximate surfaces of the teeth frequently, and by having the patient pass floss-silk or use the tooth-pick daily between them," I intended it to be inferred that I rely mainly upon the operator for the success attending this method. I really meant (for then I was referring to the "prevention" of decay by the "permanent separation process") that such disintegration can thus be prevented, without "separations," by commencing at about the time of or soon after the eruption of the teeth, and continuing until they become so dense as not to require such frequenting polishing, and that no more attention or more frequent visits to the office are required than where "permanent separations" have been made.

In referring to the statement that when the contour of the part is properly restored in gold, and the margins of enamel against which the gold is built (the edges of which have been trimmed down to and are finely finished with such enamel) are free from contact with an adjoining tooth, and are kept quite clean by the saliva, which is "kept in almost constant motion by the action of the tongue, lips, and cheeks," caries will not be likely to recur, Dr. Chupein states that "this is such a very broad assertion that we fear we can make none in our mode of operating (self-cleansing spaces) that will stand against it," and that "he has it within his power to make a convert of us to his system if he can satisfactorily prove this assertion." I have not aimed at the conversion of Dr. Chupein, or of any one else, but to simply state the truth; nevertheless, it will be satisfactory if the doctor is in a condition of mind to receive it and be converted. The answer to the following question should "prove the assertion" referred to. Dr. Chupein inquires, "Why is it that the oral fluids are kept in almost constant motion by 'the action of the tongue, lips, and cheek,' thereby preventing decay after operations of this kind (contour) are performed and not *before?*" Simply because the enamel at and near the point of contact of the proximate surface of one with that of the adjoining tooth is out of the course of the direct current or flow of saliva, and for this reason, in addition to that of the part of enamel in contact holding particles of food so firmly (or because they have so accumulated about such part) that it could not thus be washed away, such a surface is not, therefore, so cleansed, and disintegration of the enamel, at or very nearly such part in contact, takes place. But "that caries will 'very rarely recur' at the juncture of the gold and tooth-substance" is what Dr. Chupein "very much doubts;" hence he states his "opposition to that style of work which puts this point of juncture out of sight." He evidently does not know exactly what I have been referring to; at least here, as in other instances, he displays a lack of knowledge of the true principle of restoration of contour. If it were otherwise he could not have made the assertion just quoted. I have, over and over again, plainly stated that the contour of the part operated upon should be so restored in gold that the prominent portion of the solidly-impacted, well-anchored, and finely-finished gold so come in contact with the adjoining tooth near the buccal and masticating surfaces of the teeth as to leave the margins of enamel (against which the gold has been carefully built and finished) free from contact with the adjoining tooth at every point, and, being thus free, every part of the juncture of gold and enamel can be examined if necessary; but here I would say that if the operation has been as perfectly performed as it should be it will not *require* the repeated examinations which the fillings inserted by the "permanent separationists" evidently do. Such an operation as referred to can be relied upon even if a portion of the filling so extends towards the neck of the tooth as to be "out of sight," but neither enamel nor gold in one should come in contact with the same in another tooth at or near such point, although this contact is almost invariably brought about both by those who attempt (and do not succeed in) restoration of contour and those who practice the "permanent separation system;" and for this reason, and because of the very imperfect manner in which operations are usually performed and fillings finished at the "cervical wall," decay recurs. If, on the contrary, the operation be properly performed, and a space, as in nature, be left at and near the necks of the teeth which are in contact, near the buccal and masticating surfaces, and there be freeness of contact of enamel, decay will rarely take place again. Disintegration commences, almost invariably, at or near the point or parts of enamel in contact, and, after the dentine is reached, caries advances beneath the plate of enamel in all directions,—decay *commencing* in very rare instances at or near the necks of the teeth, because they are free from contact at such part.

When the operation of restoring the contour has been properly performed, the part restored in gold, which comes in contact with the enamel or gold in the tooth adjoining, will not "wear flat," as Dr. Chupein states, at least not so rapidly as he intimates, because this gold should be cohesive, and, by the aid of the mallet,—the electro-magnetic,—made thoroughly solid and uniform in density throughout, when it will be far harder than he or the metallurgists would have us believe. In proof of this, observe what little effect attrition has upon *solid* gold inserted in cavities in the masticating surfaces of teeth. Doubtless the "adult skull of twenty-five or thirty years of age" which Dr. Chupein examined contained teeth of first- or second-class structure,—a greater part of the proximate surfaces of such teeth usually comes in contact than where the structure is of the third or fourth class. But even if attrition, facilitated by the movement of the teeth within their sockets, one against the other, should result in the wearing down of the gold, and the teeth be preserved during all this time, the tissues of these organs would have become so dense and the oral fluids so changed, that decay would but rarely recur and but slowly advance.

Dr. Chupein argues that the "contour system" has not been tested so far as time is concerned. Operations performed by such operators as Drs. Atkinson and Varney have stood the test of time; Dr. Atkinson and others continue to advocate restoration of contour, and I fully believe that if Dr. Varney yet lived he would be one of the strongest advocates of such operations. The doctor also states that "permanent separation" had been successfully tested long before Dr. Arthur advanced his "system." This is true to the extent that the teeth which were saved by such method (like the fillings which were inserted about the same time) have only been saved according to the law of the "*survival of the fittest.*"

Caries occurring at or near the point of contact of the teeth cannot be removed by the "permanent separation process" and yet, as Dr. Chupein states, not interfere with the natural point of proximation of such teeth. If such "separations" be made in "*anticipation* of decay," then the point of future contact may not be far removed from the original; but if disintegration has penetrated the enamel and the dentine is involved in the carious process, where still further destruction of tissue occurs, then it is more difficult to so shape the proximate surface, through "permanent separation," that the point of contact of enamel be at or near where it was originally. I have observed that in cases where the "permanent separationists" find it necessary to insert a filling in a cavity within a proximate surface they usually *cut* quite extensively that they may "reach the cavity." I have seen such cases from Dr. Arthur's hands, as well as from those of others, and even with the "*self-cleansing spaces*," with the fillings which had been inserted "in sight" (and all this, too, in teeth not the most liable to caries), a number of such fillings were no longer "*in sight*" and decay had advanced around and about others. Had these operators attempted restoration of contour, the failure would not have been less decided, and they, like Dr. Chupein, would doubtless have attributed the cause of such failure to "incorrectness of the principle" of this method.

There are many who attribute the cause of failure, so far as the operations which they perform for the preservation of the teeth are concerned, to "soft, chalky teeth;" a lack of the nutritive supply to the mother while her child was in utero, and during lactation; a certain diathesis, and hysteria, or, as has been taught, to the effects of cold north winds upon the organs "treated;" and to chemical action and electric currents evolved therefrom, notwithstanding the fact that such chemical action cannot take place unless the operation be so imperfectly performed as to admit acids to parts around and about the filling. While I have endeavored to observe all this, yet I could not refer the cause of those failures which I have had to anything else than my incapability or failure to perform a really first-class operation.

Because of these failures, Dr. Chupein will certainly not suppose that I practice and advocate restoration of contour, and yet am not successful in preserving the teeth of those who seek my services. That there may be no such supposition, I will make the following reference to my practice. I always endeavor to so perform each operation and so finish each filling that it shall conform to the line which defined the original structure,—"*contour signifying the line that bounds, defines, or terminates a figure.*"

Whether that figure be large or small, I contend that the gold should be built out to or a little beyond, and then finished down to that line, —the enamel. This line should be restored to a degree commensurate with the extent of destruction of tissue. As an indication of the time required for the performance of such operations, I will state that I operate each day for four, six, and sometimes one or two more patients. For some I insert one and for others two or three fillings, and finish all these fillings smoothly at every part. In the performance of these operations I use from a half to an ounce of gold-foil per week. I could not do all this within the time mentioned were it not for the rubber dam, the electro-magnetic mallet, dental engine, emery-cloth, and other such appliances.

As an evidence of the success attending the performance of such operations, I cannot but state that I have not made it necessary for a patient to wear a plate with even a single artificial crown attached for three or four years, yet I have, in quite a number of instances, attached porcelain crowns to roots of teeth by one of several methods. Previous to that time, however, I was both "*weak and wicked*,"—*weak* so far as knowledge and ability to save teeth and roots was concerned, and because I was influenced by patients, who had been led to believe that the only relief for odontalgia and neuralgia was extraction of the teeth, and *wicked* because I robbed such patients of organs more precious than diamonds.

Now, however, when I have completed all the operations required in the mouths of my patients, and made their teeth again clear, bright, and beautiful (and I again say that the attention given by a patient to the teeth will be in proportion to the care, attention, and skill bestowed upon them by the operator), they keep them so, and I very rarely have anything further to do for them.

I did not have in mind any one who had quit his dentist and sought the services of another, when I wrote "I know that many of their patients" (patients who have had "permanent separations" made between their teeth) "*almost curse* the operator whenever mastication is attempted." I referred to those only who had been *finished* by operators who practice the "permanent separation system," and to practitioners who had had such "operations" performed, but who, having tested the "system" and found that caries had progressed to a considerable extent (notwithstanding the "*self-cleansing spaces*"), decided to have (and did have) the contour of the parts, which were cut away and destroyed by caries, restored.

Dr. Chupein states that he (like those to whom I have just referred) "would prefer" operations wherein the contour is restored, but he "considers" that he "consults the patient's interest and welfare" by practicing Dr. Arthur's "system." Might I not as well ask the doctor for a better reason for not obeying the "golden rule," and that, too, without attributing to him "unworthy motives"? The answer to this is given by himself when he states that he (Dr. C.) has been "enabled to save more teeth by the 'permanent separation' process than by the other method;" and this I do not doubt, so far as his ability is concerned, but he acknowledges that it is not the best which can be done when he states, "without hesitation," his "preference for contour."

Whether that which I stated in my former "reply" to Dr. Chupein relating to "experience" be a "rhetorical flourish" or not, I only know that it is but the *truth*, for *experience* is certainly no evidence of ability to *do* that which one *professes.* It is really not advisable for a student or practitioner to adopt the views of operators simply because they have had "experience." Were a *demonstration* rather than a *profession* of ability to perform operations to be the test, many practitioners who are now considered "first-class operators" would not be thus over-estimated; but, on the other hand, many who are not now so known would be raised far higher in the scale, so far as reputation is concerned.

Dr. Chupein observes, that "to restore those beautiful lines and forms is an innate pleasure to all who can appreciate the beauties of nature or the imitations of art," and yet states that "it is not our own personal vanity, our likes, whims, or fancies which should be our guide." Yes, but while the operations whereby the line which defined the original figure is restored in gold come the nearest to perfection, and are the most desirable, they are difficult; and that they may be successfully performed requires that the operator have a proper understanding of what they should be, and the ability to carry into execution the design as furnished by nature; and as to "vanity," "whims," and "fancies," these things are not characteristic of one possessing genius, but of those only who attempt but have not the ability to perform the operation known as restoration of contour.

Dr. Chupein asks whether it is my "desire to limit successful dental operations only to the few possessed of this high order of talent?" "To complicate the operation of filling teeth instead of endeavoring to simplify it, so that only the *few* instead of the many might be benefited?" In reference to all this, and to the "pay for contour operations," I would say that the "masses" would be all right if all, or far the greater number, of those who *profess* to be dentists were what they should be,—thoroughly capable of treating and preserving the natural teeth. If one has not the time to relieve all of pain who seek his services and to preserve their teeth, even with temporary fillings for a time at least, until time, opportunity, and means are afforded for the performance of a permanent operation, then one should intrust those for whom he has not time to operate to the care of one who has,

—to as good and conscientious a practitioner as he can find near him. Time is a more important consideration than the material used in the performance of operations. Still, notwithstanding this, under *no* circumstances should they be indifferently performed, or the fillings roughly finished. Those who are not engaged much of their time (and there are many such) can well afford to spend a good part of such time in performing operations and restoring, or attempting to restore, the part or parts destroyed, even for a small fee, because in doing so they are not only developing or acquiring the talent or ability to perform these operations, but also demonstrating to the community in which they are located that which they are capable of doing. Patients who then seek their services will be at least willing to pay them a proper fee for such operations and for preserving the natural organs; otherwise, they cannot be expected to do this. While first-class operations are not too dearly paid for, yet those who insert "fillings" carelessly or imperfectly are not really entitled to receive the fees which they do, nor justified in increasing them, unless the character of their operations be raised.

It is far better for those who are incapable of properly inserting or manipulating gold to use amalgam than to extract the organ affected; likewise I contend that it is better to cut away a part and save what remains of the teeth than to deprive patients of the organs altogether. But why should operators have so little taste, such lack of laudable ambition, and so little regard for the finely and beautifully organized structure as to content themselves with simply being capable of using amalgam, even if they can properly prepare the cavity of decay, insert the material, and finish it, or to insert gold and then cut away tooth-structure so as to conform to such filling, and to make "permanent separations," to mar the beauty and at least partially destroy the usefulness of the organ thus treated? No thoroughly capable, conscientious practitioner, having nobility of soul and an appreciation of that which is good, useful, and beautiful, can adopt or practice any such "system," unless he has been led to believe that there is no better, higher, nobler method. Would that all possessed the ability and the will to reach this higher plane rather than be content to adopt and practice such a "system" as referred to! "Limit the performance of successful dental operations only to the few who possess high order of talent?" No! Neither would I discourage the NOBLE "FEW" and intimate that they should come *down* to the level of the many; these latter should be willing to accept the teachings and endeavor to acquire ability to perform, or at least *imitate*, the many fine operations performed by the "few." I would not, if I could, "limit the boundaries of science nor prescribe the advances of art."

Dr. Chupein states that "the aim of all science and art is simplicity." "*Simplicity!*" Why? Because manufacturers and speculators—men who, by their *money*, so control "men of science" that they "*simplify*," and *imitators* of works of art, who produce a something having the *appearance*, perhaps, of a "work of art"—resort to this "*simplicity*" that a greater *profit* may be had. There are operators practicing the "permanent separation" of the teeth—the "system" of the "*simplification*" of the dental art—who, like those practicing the "*Instantaneous System of Filling Teeth with Gold*," do so because there is "*more money in it.*"

While "the masses" *may* be benefited through the "simplification" of "science and art," yet this is not truly "the aim of *all* science and art." The aim of true science and art is not "simplicity," but *truth* and *perfection.* If "simplicity" is concomitant with the pursuit or acquisition of these, all well and good.

In literature, sculpture, painting, and music, as well as in operations such as we ought to perform, it is not the "aim" of a Dryden, a Michael Angelo, a Raphael, a Beethoven, or a Varney to write, carve, paint, bring forth in "concord of sweet sounds," or produce in gold that which will be merely simple and cheap, but perfect and beautiful. To all, therefore, who are engaged in the dental department of science and art, especially to young men, I would say, move ever onward and upward,—let "excelsior" be your motto,—and when your work is accomplished and you shall have reached as near perfection as you possibly can, and have performed your duties faithfully and conscientiously, regardless of the fee which you may expect to receive, you will be crowned, as was the youth who bore the banner with this same "strange device, Excelsior," and upon it may be written in characters of gold, "Well done, thou good and faithful servant."

WHAT I KNOW ABOUT RIGGS'S DISEASE (SO-CALLED).—HOW DOES IT HAPPEN THAT THIS TITLE HAS COME INTO EXISTENCE?

BY GEO. A. MILLS, BALTIMORE, MD.

At a meeting of the Connecticut Valley Association, held at Northampton, Massachusetts, a few years since, a resolution was passed that gave credit to Dr. Riggs for some originality, relative to new and special features in the pathology of the disease caused by, or connected with, deposits of salivary calculus in the oral cavity. Dr. Riggs claims that the pathology laid down in all our dental literature does not agree with what his observation, experience, and practice have revealed to him. He claims that more is needed than the removal of the deposits that have so insidiously laid themselves on the necks of the teeth, and from that *first* point of deposit continued to extend towards their apices, in many cases reaching them after a lapse of time, more in some cases than others, owing to conditions which may retard or promote the progress of the disease. He claims that the edge of the alveolar process is found in an abnormal condition, and that it is necessary to remove it to secure a healthy condition, and instances the theory that is acknowledged and practiced in general surgery, *i.e.*, "remove not only the diseased portion, but do more,—cut back into the healthy parts." No one will dispute this as lacking soundness in theory and practice. Dr. Riggs claims to have given this matter an earnest attention; especially so over a period of twenty-five years or more. I have seen letters from intelligent people, dating back twenty years, giving much credit to Dr. Riggs for success in their own mouths, and those letters made use of expressions *indicating very plainly* that he had given *especial attention* to this matter.

Now, any one referring to our dental literature will not find much encouragement to cope with the advanced condition of the disease in question, or any great amount of assurance that his efforts will be successful. In our literature it is mentioned under a variety of misnominations, such as disease of the gums, softening of the gums, sponginess of the gums, bleeding of the gums, etc. These phases are spoken of as different diseases, and many remedies are prescribed, etc. These are all claimed by Dr. Riggs to be stages of the same disease, and amenable to cure only by the treatment in question; these several named phases being only the results of the first. I am fully convinced that this subject is not generally understood by our profession. If any one will take the trouble to refer to a report in the *Missouri Journal* (I think) of October, 1876, he will find evidence given by the members of the Odontological Society of London, which I am confident may be taken as the general opinion. I give this as my conclusion, based upon reading, personal conversations, and letters received, and I am glad I have the written testimony of some who are eminent to fortify me in saying what I have. As to whether Dr. Riggs is entitled to any credit for originality, every one will have his own opinion. I do not propose to wage any controversy, but simply to put my words before the profession and let that problem work out its own salvation; but I feel sure that no one will be able to produce any writings where this *special* feature is noticed, and discussed with the special treatment kept in view, as necessary to secure successful results. Just here comes the failure to secure good results in a large number of cases where the effort is made,—where the advanced stage of the disease exists because the special feature of its pathology is not recognized, nor the necessity that the *abnormal edge* must be taken off by cutting even into the sound tissue. Many cases have failed to be cured, because only the deposits of concrete material about the teeth and their roots have been removed. In every case they would be *much improved;* but the healthy constriction of the gums about the teeth would not be secured. Now, if what I have said of this special feature of the pathology brought to our notice by Dr. Riggs cannot be refuted, and his method of treatment proves successful beyond the general methods in practice, is it not just to admit that this shows an advance in knowledge and practice? and that it should inspire every one with new zeal to meet the sadly unmet disease which is found in a majority of the mouths both of youths and adults, which are under the care of the dental profession, and this, too, among the best brushers? It can be readily proved, that though the deposits are *not* external, and under the ready view of the eye, *the mischief* is at work, and cannot cover up its tracks. I have heard its presence denied by good men, when pressure on the gums would exhibit a generous drop of pus, exuding from between the proximate territories of the bicuspids and molars, though the buccal parts would indicate health.

The report of my remarks at the meeting of the American Dental Association, as published in the January number of the DENTAL COSMOS, is somewhat mixed. While I am reported as saying, "I did not give any credit to Dr. Riggs," it makes me give him an abundance of it. Any one who has heard me speak of the matter either in meeting or out within the last two years will not have much doubt of my belief in both the *theory* and *practice* of Dr. Riggs. His theory of the pathology of the trouble appears to my understanding *sound;* his practice *I know is*, both from an extended observation at his chair, of the mouths of his patients, and from a very practical and satisfactory demonstration in my *own mouth.* One year ago last June, I saw a stage of the disease about my own teeth that must have been the work of many years, probably not much less than twenty. With a general healthy appearance of the tissues about the surfaces, where the brush had been faithfully used, there was shown by the pressure of the thumb and finger on the buccal and lingual surface an exudation of pus from between the bicuspids and molars, and the treatment proved that there had been an extensive destruction of the osseous tissues in this territory. This is a matter of too much importance to be overlooked, and I am confident that already good seed has been sowed that will bear fruit. The practice has been, in too many instances, to undertake very difficult cases at the outset. Hence the cry of failure, etc. I think it would be safer and wiser to commence with simple cases, and I am sure that he who desires to be successful will be by pursuing this course. My purpose is to say more in another paper, and I will then endeavor to point out some of the expressions of this disease, which I very generally find have not been noticed by those I have conversed with.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.—SIXTEENTH ANNUAL SESSION.

(Continued from page 25.)

THIRD DAY—*Morning Session.*

THE association met at the usual hour, the president in the chair. After the transaction of routine business, the subject of Chemistry was resumed, and a report written by Dr. Cassidy, a member of the committee, was read by Dr. Shepard. The following is an abstract of the paper:

The title of Dr. Cassidy's paper was "Sleep *vs.* Anæsthesia." Fully realizing the difficulty of detecting the chemical changes which take place when any substance is introduced into a living body, the writer believed that these changes may usually be suspected, if not proven by analogy. It is not unreasonable to assume that a substance capable of subduing all the senses of an animal must either act as a direct poison, or must induce such chemical reactions as will result in the formation of new compounds, which are the real anæsthetic. An idea appears to exist that sleep and anæsthesia differ only in degree and not in kind; there is, however, a wide distinction between them, as regards chemical relations. Anæsthesia is opposed to the natural order, involving increased chemical action, while sleep is a negation of molecular death; nor is it a mere negative condition, a rest from activity. To repair a loss there must be restitution of abstracted force. Sleep is a process to accumulate a tangible something, lost by mental or physical exercise. There is a strong probability that the chemical changes coincident with life are mainly processes of oxidation; but if this be so, whence is oxygen obtained in sufficient quantity? We answer that it comes only during periods of repose, when the system appropriates an amount commensurate with recent expenditures, and as a reservation to support the waste of tissues in following hours of labor. Observation has demonstrated that there is more oxygen inhaled and less carbonic acid exhaled in a given time during sleep than during exercise, and a vast increase in the exhalation of carbonic acid is observed during violent exertion. These facts indicate that the oxygen regularly inhaled is mainly devoted to assisting the carbonic acid to penetrate into the air-cells of the lungs, and that the small quantity which disappears at this time is required to convert the ferrous carbonate in the circulation into ferric oxide. Sleep is an oxygenating process, and its opposite condition mainly implies the expulsion of carbonic acid. What bearing have these facts upon the therapy of anæsthesia?

As there is but one science of chemistry, we must admit that the same laws apply as well to those changes which occur under the influence of vitality (minus soul or spirit) as to ordinary reactions in the inanimate world. Nitrous oxide is similar chemically to atmospheric air, but far more energetic, owing to the larger proportion of oxygen it contains, and to the fact that this element assumes in any reaction the nascent state. It is only as it suffers decomposition, which it readily does, that it can be deemed a supporter of combustion or respiration. It is a powerful oxidizing agent, nearly equal to ozone. Inasmuch as it supports combustion only by virtue of the oxygen it contains, it is fair to believe that it supports respiration by the same property. A course of experiments, continued for some years, has convinced the writer that this gas is a supporter of respiration, provided the carbonic acid, which accumulates under its administration much faster than under ordinary breathing, be freely and constantly expelled. Observing this precaution, its administration may be continued indefinitely, the individual meanwhile being natural in feature and perfectly unconscious; but if, as is the case in the ordinary administration of the gas, this be neglected, an alteration from the natural to an appearance bordering on the horrible is produced,—a condition analogous to partial poisoning with carbonic acid. It is probable that respiration is supported only through a decomposition of the elements of the gas. The reaction cannot be followed in detail, but it is probable that the substance introduced reaches the ultimate molecules, where the oxygen is set free, and a rapid increase in otherwise normal reactions is produced, among which is a greatly augmented development of carbonic acid, which appears to be the only appreciable product of the reaction, and the assumption is advanced that to the excess of this gas is due the special anæsthesia. It is certain that in moments of great effort sensation is invariably lessened. Possibly the ordinary molecular changes would be unendurable but for the coexistent evolution of this gas. It is not, however, claimed that carbonic acid is an anæsthetic in the ordinary meaning of the term; its power to extinguish life would forbid its use for that purpose. The employment of anæsthetics, if admissible at all, should obviously be restricted to those agents which act only by decomposition when inhaled, thus inducing simply an increased natural reaction, in contradistinction to those bodies which act directly and are therefore incompatible with normal function,—of which class chloroform seems to be a true representative. Even when exhibited in small quantities its ability to smite the heart unto death is suggestive of this view. In the first class is included, with nitrous oxide, common ether, its molecular composition and the absence of attendant evils in its use both favoring such a hypothesis.

A volunteer paper on "Solution" was then read by Prof. Taft, after which the subject of Chemistry was opened for discussion.

Prof. D. D. Smith (of Philadelphia) said the last paper had no special bearing upon the subject of dentistry; but the matter of Dr. Palmer's paper on chemistry was most intimately related to it. Galvanic and chemical action in the mouth was elucidated a year ago; but few seem to regard or understand it better now than at that time.

When the nature of these forces is understood, the conservation of teeth will leap forward, as it were, years in a day. If I understand operative dentistry, no certain advancement has been made in this direction. The paper of yesterday (Dr. Harlan's) I regard as most pernicious in its teachings. Gold is not the Alpha and the Omega in operative dentistry; for chemistry comes in and says that in certain cases it is the worst material that can be used. Chemistry says it is not always "the man behind the instrument" that preserves the tooth, but it is rather observing and obeying the laws of these other forces. If Dr. Wetherbee has no failures at the cervical walls in bicuspids and molars, his experience is the reverse of ours in Philadelphia; is it because we have not the skill to do the work properly? We have twenty-five men in this city, as good operators as can be found in the world. Chemistry has an important bearing in the case. How may we prevent galvanic action?—for it does exist.

Just so far as we widen the distance between the galvanic state of the tooth-substance and that of the filling material, just to that extent shall we fail to accomplish the best results.

Having regard to these forces, we say there are no better filling materials than oxychloride of zinc and gutta-percha; but one disintegrates in the fluids of the mouth and the other is easily affected by attrition, necessarily limiting their use.

Amalgam, in certain cases, can be used with far greater probability of success than gold.

Dr. Wetherbee. What is it in amalgam that preserves a tooth better than anything else?

Prof. Smith. Electrical action between dentine and amalgam is much less than between dentine and gold; hence the amalgam, in cases of such action, is a better preservative than gold.

Dr. Wetherbee explained that he did not say he had no failures; he was not so presumptuous. He meant to say that he had no more failures with cohesive than with soft foil, and, with the exception of a certain class of teeth, no more failures at the cervical margin than elsewhere. Amalgam preserves a certain class of teeth that gold does not; this is due to the formation of sulphide of silver, which in soft teeth is a better preservative than gold. He sympathizes with the last speaker when he says that preservation of teeth should be the object of this body; if we lose sight of this object, we shall fail of the work designed for us. It has been said that this matter was settled a year ago. It may be that it has been explained why decay proceeds in certain cases; it may be that gold is unkindly there, and does not perform its function. Acrid secretions play an important part in the matter; may they not be more important than galvanic action? He does not believe the presence of gold in teeth gets up such a tremendous *furore* as to call Franklin from his grave. The matter is capable of solution on other grounds. Amalgam is more susceptible to galvanic action than gold, and when it preserves teeth better, it is simply because of the formation of the sulphide of silver.

Dr. Barker explained that he did not oppose replantation under all circumstances; but he objects to the removal of cemental tissue before replantation. We cannot ignore physiological and pathological facts. When tissue has been removed, every principle of physiology is set aside.

Dr. Clowes. Chemistry is at the bottom of decay; there is no decay without it. If the teeth are left in contact you cannot save them. Contact furnishes a place where the enemy harbors, and works in his chemical laboratory. Making a separation is a most beautiful way to interrupt these currents, and the best operators fail because they do not interrupt them.

Dr. Mills is surprised that there is so much argument on the subject. We overlook some points in defending others. Prophylactic treatment is the most important plank in the road to success. Cleanliness is a most important thing, and lies at the bottom of success, and if we do not recognize it we leave untouched an important point. Many teeth are lost by an unhealthy condition of the mouth. These things should not be ignored. It is possible to do much to train patients, and those who spend time in this way are most successful.

Dr. Cunningham, of England, being invited to speak, said that Dr. Palmer was the first gentleman on this side of the Atlantic to call attention to this important matter of chemistry. Electro-chemical action has attracted the attention of prominent members of the profession abroad. Professor Bridgeman has written a prize essay on the subject, which ascribes all decay to electro-voltaic action. This gentleman says that tin is to be avoided because it is negative. Dr. Palmer proves that tin is superior, but it oxidizes and is soft. The speaker then described some experiments he had been engaged in, the object being to ascertain the galvanic action between dentine and filling materials. The results were, in general, in keeping with those of Dr. Palmer's experiments.

Dr. Flagg. No subject has made so much impression as this. The preservation of the natural teeth has been his only object in practice. Those teeth which are "too far gone" he does not leave till the crown is gone and the root necrosed. He had endeavored to find out why fillings so constantly failed. The speaker then read from the DENTAL COSMOS, showing the diversity of views held by different writers (Webb, Chase, Dwinelle and others), some maintaining that failures were mainly owing to defective operations, and others that they were mainly due to chemical causes. One says one thing and another another. He had bottled and labeled a collection of fillings from the best men, a double handful of them, which he picked out with a hair probe. It was a sad collection in one way, and a glorious one in another. Gutta-percha, which is called an "ephemeral stopping," has sometimes lasted two to three times as long as the best gold fillings. Amalgam is the best of the plastic fillings. You can find fillings of it inserted thirty and forty years ago, and still good.

Dr. Webb. Failure in a majority of instances is due to the very imperfect manner in which operations are performed. We lay the blame to acids and to neglect on the part of patients, when we have failed to perform a clean operation. We should know whether one who makes these statements is a first-class operator.

Dr. S. B. Palmer. In a paper read before the Odontological Society, it was claimed that gold in the hands of a first-class operator saved ninety-five per cent. of the teeth filled, and proportionately less with inferior operators. He agrees with Dr. Webb that failures are due to imperfection, but that failure reduces the teeth to a class which must be saved by other means. Mechanical preservation should be mainly relied on, but when we need something better we can use amalgam, from which is formed the sulphide of silver, which exerts a preservative influence and neutralizes the destructive action.

The subject was then passed.

The subject of Dental Therapeutics was then taken up, and a report written by Dr. Brackett, a member of the committee, was read by Dr. Shepard. We give an abstract of the paper, as follows:

The report stated that the work of medication, as compared with surgical and mechanical practice, is slow and indefinite; hence therapeutics is subordinated to fine operations by those impatient of results. Until of late, dental education has not included a thorough study of the principles upon which therapeutics are based. Much of the dental medication of the past has been empirical, and that of the present is not entirely otherwise. Each year, however, marks steps of progress; more thought is expended upon treatment. The progress of the past year has not been so much in the introduction of new remedies as in better and more consistent modes of application and administration of healing agencies. A better knowledge of underlying principles has led to a better practice. Instead of making one remedy or system of treatment do duty for all lesions, the infinite variety of conditions and individual peculiarities are considered, and such agencies chosen from the entire range of the materia medica as appear best suited to the special case. Brains are more and more exercised in this department. Perhaps in no branch of the subject has there been more activity than in prophylactics. The large percentage of teeth of soft texture and crowded arrangement has led to much deep thought concerning the causes of this condition, and the possible prevention of their further operation. Concurrent testimony indicates that one of these causes is found in the deficient supply, during development, of those elements from which the bones and teeth are formed; and some practitioners have endeavored to supply the deficiency by a diet rich in lime salts, or by the administration of chemical preparations of the same. This plan has perhaps not been sufficiently tested to demonstrate that it will always be followed by good results; but the theory is reasonable, and gratifying effects have been obtained. The earlier in life the treatment is adopted the more effectual it will be; quite as much can be effected during utero-gestation and lactation as at any other period, and it is not understood that in adult life much can be accomplished. Another condition, which it is more and more felt must be combated, is acidity of the oral fluids. Carefully conducted tests seem to show that a strictly normal condition of these fluids is only exceptional, acidity appearing to be the rule. The corrosive effects of these acids are familiar, and no dentist who employs mechanical means only, in combating them, is doing his full duty. Antacids are used for this condition, both locally and systemically, and influences to improve the general health should be brought to bear. Instruction is given to patients as to the benefits of legitimate exercise to the teeth and their investments, such as is found in the mastication of hard and tough substances. Another point in prophylactics is the prevention of the sensitiveness and other bad results following the introduction of a metallic filling. Dr. E. W. Foster published in the Dental Cosmos of March, 1873, an article alluding to the use of the hyposulphite of lime, as being happily adapted to secure the object aimed at. In Boston, in May last, the same gentleman presented a more elaborate paper on this subject, stating that three years' additional experience had confirmed his former favorable views in regard to this application. The writer of the report, in a three months' use of the same, had found that it appeared to possess many of the advantages claimed for it by the gentleman who had brought it to the notice of the profession. As a whole, the tendency of thought, in New England at least, evinces a disposition to take advantage of all attainable sources of knowledge, and to make that knowledge subserve the comfort, health, and best interests of patients.

Dr. Atkinson followed with a report upon the same subject, of which the following is a summary:

The report opened with the statement that a complete history of therapia and its necessity demand a review of all that is recorded in medical knowledge. Therapeutics cannot be said to be an exact science, though every proposition relating thereto has its root based upon a common foundation with mathematics, music, and astronomy. Long before anatomy, physiology, or pathology were known, there were those who assumed the conduct of diseases; every addition to therapeutics from that day to this has been either an assumption of a revelation or a real revealment. All the laws of the organism must be understood to enable us to assert that the organs are in place and the functions normal; any perversion of this state constitutes the beginning of disease, and anything that will remove the perversion is a therapeutic agency. It may be questioned whether there is any exact standard of function yet revealed; consequently, therapeutical science only approximates to scientific certitude. Each individual may be favored or hindered by surrounding circumstances, and in order to lay out the probable career of the individual it becomes necessary to comprehend these, as well as to trace the lines of ancestral endowment which lead to the parents from which the individual was produced. At one time each human being is a part of two secretory apparatuses, denominated father and mother; and the confluence of the two semens is the inception of a new career. The changes that follow during that career are but the evolution of the potentialities involved in the original germ. This germ is an equation of diverse hemispheres of mass and energy. Either the father or mother may furnish the preponderating characteristics, but the normal equation would be the confluence of molecular masses equally endowed with bonds of affinity.

Disease is imperfectly performed functional action, the simplest form of which is a minor expression of function. The energy that brings the functional tension to its normal standard is the first example of therapeutic agency. Therapia depends on the law of demand and supply of measure of affinity requisite to the formation of the factors of function. The satisfaction of demand may be immediate, mediate, or intermediate. Generation of tissue depends upon reciprocal interpenetration or satisfaction of bonds occurring in the units of tissues. Maintenance of tissue consists in the feeding of these units. Reproduction of tissue follows the formula of the process of production, by the conversion of pabulum into cells and cells into tissues. Maintenance of tissues consists in a regular advent and transit of cells along the fiber of the tissue, the pabulum being converted into the substance of the tissue by a process of cell-feeding analogous to breathing; the pabulum is taken in by endosmosis, and the worn-out material removed by exosmosis or desquamation. In case of considerable loss of tissue by violence, a form of reproduction analogous to original generation presents; a pocket must be secured in the surrounding parts; this pocket stands for uterus and holds the protoplasm, which is the liquor amnii, into which the new blood-tracts or capillaries are projected, to construct the tissues of replacement. Exsected nerves and bones are capable of this kind of replacement, when the necessary pockets are secured, so perfectly as to elude detection. Health is the exercise of full measure of function; disease is some interruption or minification of this harmonical expression. To understand the disturbances which call for therapia, it becomes necessary to understand not only function, harmonical and inharmonical, in mass, but to analyze and trace it to its elemental expressions, to unravel the modes of biological and chemical metamorphosis, as steps in one category, instead of ignoring biology in chemistry and chemistry in biology. The stupidity of claiming that chemical activity is a motion without life will be made apparent by any well-conducted chemical investigation. Chemistry does not busy itself with accounting for the existence of atoms, but only with their association and dissociation; and this has been made known to us by empirical experiments in the laboratory. It is regarded as unsafe to predict the behavior of any bodies placed in untried relations. Let us take the example of nitrogen and oxygen and see if their behavior does not reveal to us that they have both intelligence and volition, the satisfaction of which generates the various bodies called nitrous oxide, nitric oxide, etc., which differ in action upon the human body, all the way from a respirable gas to a terribly destructive dense liquid,—*aquafortis*. Nearness, "within the sphere of influence," and a current of energy known as the electric current, are the circumstances necessary to the combination of atoms and the generation of new bodies,—molecules. This current is the high-priest that justifies in marriage the hitherto potential, now active, measures of energy. The awakening of energy must be complete to secure completeness of its exercise; when it is but partial, the body produced will be short of a standard measure of energy in just that ratio.

That we may understand the great variety of potential bonds to be awakened and joined, to secure the full measure of endowment presented in the complete human adult, we must remember that the metamorphoses of mass and energy belonging to the mineral and vegetable kingdoms were necessary steps to produce the refinement of molecular metamorphosis potentially held in animal protoplasm, the most refined example being human protoplasm. Any number of portions of naked protoplasm being brought together, will coalesce into one homogeneous mass without differentiation; but when any portion becomes inclosed in a limitary membrane it may be converted into neural, connective, glandular, muscular, or osteal primates of tissue. The human embryo, being an undifferentiated amœba, must pass through all the degrees of mollusca, vertebrata, and mammalia, to the fully enfranchised genus-homo to present us with the completeness of the whole in MAN.

The deterioration of any function is a sickening process; anything by which this sickening is overcome is a curative or therapeutic agent. Cure consists in destroying and removing abnormal functions, so that physiological energies may hold normal sway in the production, maintenance, growth, and shedding of elements of tissues. In making application of therapeutical agents, we should bear in mind the sources whence we derive our means of cure. They are derived either from the animal, vegetable, or mineral kingdoms, and all depend upon measures of energy for their effectiveness. All solids pass through the stages of vaporous, liquid, colloid, and solid forms of presentment. Predominance of crystalline character marks the mineral kingdom; of cellular character, the vegetable; and of colloid or soft-solid character, the animal kingdom. The first solidifies by simple accretion, the second is formed by cellulation and accretion, and the latter by corpusculation, cellulation, and accretion, in alternation. All sorts of therapia have been advocated, from the watch-and-wait system to the most pronounced and heroic practices, such as emesis, catharsis, and depletion. Each one advocating his own view, the unlearned have been befogged, and disgust and indifference begotten, preventing the elaboration and demonstration of the true system of therapia that investigates every fact. There is one point too little regarded by those who write upon this subject,—that is, personal compatibility of medicines, or idiosyncrasy of patient to physician and to remedy; that is to say that the same prescription, given by different physicians, will not be followed by like results. There seems to be something in the personality of the prescriber which goes with the medicine to cause it to accomplish his good intention, and this intention is the agency through which the potentiality of all remedies expresses itself. Were this not a personal emanation, all remedies would operate uniformly in all cases. Not until we have had a new deal in therapeutics will it be possible for us to be efficient in practice by merely following out the accepted formulæ. When that new system appears, it will dissipate the dense atmosphere of selfishness that envelops each special system, and enable therapeutists to reject the irrelevant and utilize the relevant in each case, without the prejudices pertaining to a partial culture.

Adjourned.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the society held at the residence of Dr. W. A. Bronson, No. 8 East Thirty-fourth Street, Tuesday evening, October 17th, 1876. Vice-President Dr. B. Lord in the chair.

Dr. B. Lord reported that he had attended the sixteenth annual session of the American Dental Association, held in Philadelphia the first week in August. The attendance was quite large, from one hundred and fifty to two hundred delegates being present; that while nothing new or of especial interest was advanced, the general results must be highly beneficial; social and fraternal relations were cultivated and strengthened, and the interchange of views, privately as well as in a public manner, must lead in many instances to a more sincere and earnest regard for one another.

Incidents of Office Practice.

Dr. Geo. Bernard. I have here a specimen of dilaceration,—a left central incisor. When the child from whose mouth it was taken was six years old, she fell and fractured the tooth. The tooth was supposed to have been knocked out and lost, but in the course of a year there was an eruption of what the mother supposed to be a new tooth. Upon probing, it was found to be the root of the fractured tooth. The root was then extracted, and it came out with the crown of the tooth fused to the root, at right angles, as you see. As I believe the society is making a collection of specimens, I thought this might be of some value, and so I present it.

On motion, the specimen was accepted with the thanks of the society.

Dr. Henry N. Dodge exhibited an appliance for rotating incisor teeth.

Dr. A. H. Brockway exhibited a metal syringe, having a spiral spring so arranged as to make it self-charging; also an abscess syringe with glass barrel, devised by Dr. J. N. Farrar, constructed with a long and very delicate nozzle, the discharge being accomplished by turning a screw, forcing out a drop of medicine at a time.

Dr. W. H. Dwinelle. A short time since a gentleman presented himself for treatment at my hands who had met with quite a severe accident, by which his two central incisors were badly shattered, each being broken off diagonally across its surface, involving a loss of a considerable portion of substance, and causing great disfigurement of the mouth. The right one I found had not only its nerve exposed, but considerably more than one-half of it was broken off in a vertical direction. On its lingual surface the enamel was skived off above the gum. I found this tooth exceedingly loose. At first, I was inclined to attribute the looseness to the fact that the alveolar process was considerably broken up and comminuted. After removing the nerve I carefully examined the walls of the nerve-canal with a glass, prospecting at the same time with an instrument terminating with a delicate right-angle point; at the upper third of the root it dropped into a groove or crack, which extended entirely around the walls of the cavity; by illuminating the root of the tooth, I could distinctly see that it was fractured at this point. I did not want to sacrifice the tooth until I had made a further effort to save it; so I resorted to the expedient of filling the nerve-canal in such a manner that it would be, after I got through, riveted and cemented together—so to speak.

My method of filling roots is the old time-honored one, by carrying up small conical rolls of foil upon delicate Swedish broaches into the nerve-canal, consolidating the whole as I proceed with proper nerve-pluggers, and increasing the diameter of the rolls of gold to correspond with the shape of the canal. In this instance I resorted to the additional expedient of mixing up a small quantity of osteoplastic of a thin consistency, and dipping these conical pieces of gold into it before putting them into the tooth, so as to induce a cementation against the walls of the canal, which being of unusual diameter favored my project, by securing a large and substantial pillar of gold within itself. After this treatment the tooth was decidedly firmer in its position, and with a few days' treatment it became so firmly established that I built up an entire crown upon it, using the pulp-cavity as a basis for building up a plug of gold that should be like a rivet. I also insured the success of the operation by locating gold screws at different points, one above the gum-line. When the operation was completed, the entire lingual surface which had been broken away was renewed in gold even considerably above the gum line.

The tooth on the left side, also, had its nerve exposed, so as to necessitate its removal. Its canal was filled in the usual manner and a gold crown built upon it.

The patient was discharged a few days ago, at which time I was satisfied the operation was a complete success; all tumefaction and inflammation had entirely subsided; the alveolus and gums had assumed a healthy and normal condition: the loosened tooth was apparently as firm as ever in its position, and I find myself asking the question, whether or no the fractured portions of the root may not ultimately unite by osseous deposit?

Dr. O. E. Hill. When I promised to occupy the time of this body for a portion of the evening I supposed I would have abundant opportunity to prepare a full and clear report of the cases which I intended to relate; but I, in common with most of you, have had all my leisure time taken up in entertaining friends going to or coming from the Centennial. Therefore I shall have to rely upon the few notes taken down as the cases were being treated, and upon my appointment-book, for the essential facts and dates of what I have to give you, and, as my friend Atkinson would say, trust to the angels for the rest.

Master Shuttleworth, aged nine, came to my notice about the middle of October, 1873. His mother stated that he had been sickly from his birth, and for a long time had been subject to fits. Of late the fits had increased so that he now had them almost daily. About eight months previous she noticed "matter" on his pillows every morning; the amount had gradually increased until now his pillows were soaked. Some four months later he had a very severe illness, in fact, was given up, and supposed to be dead; certainly at the time he had more the look and odor of the dead than the living,—with colorless face, bloodless body, imbecility of muscle, and lack of power of locomotion; for he could walk but a few steps or stand but a few minutes. Locally, the gums were engorged, the processes somewhat exposed, and most of the teeth gone; those remaining swimming in the pus that exuded from everywhere, above and below; altogether, the little fellow was in a fearful condition.

On the 24th of October I made an examination, and found the bone on the left side of the lower jaw, from the symphysis to a little posterior of the sixth-year molar (which was very loose), diseased; just in front of this tooth the bone was exposed and black, and through an opening in it the crown of the second permanent bicuspid could be seen, black, and with little or no attachment. The temporary teeth were absent.

On the right side of the lower jaw, at a point corresponding to the position occupied by the temporary cuspid and first molar (the cuspid absent, molar present), I found the bone diseased, anterior and posterior, involving the processes of these teeth, and extending down on to the body of the bone. At a corresponding point on the upper jaw, involving the same teeth (both present), the diseased condition seemed identical. At a point to be occupied by the central incisors (temporary ones absent) there was a small opening in the gum, through which, on introducing a probe, I found a diseased condition of the bone, but not so extensive as at the other points. One would expect, on probing here, at the age of nine years, to find the permanent incisors somewhere, but I could not discover them.

In this case our first step must be to relieve the stomach of the large amount of pus that has been continually entering it, and in its stead administer that which will stimulate and assist in the processes of assimilation and nutrition, thereby causing the production of healthy tissue in lieu of the abortive material heretofore supplied.

First, then, we syringe the parts several times a day with tepid salt-water, not making it too strong at first, but gradually adding salt as the child will bear it without discomfort. Nourishing diet and constitutional treatment are of the utmost importance; in fact, his whole system is so involved, so low, that it will require the greatest care to give it a start towards recuperation. The child being fond of rare or even raw meat, the diet question is very agreeably settled.

The constitutional treatment will be cod-liver oil and iron, a teaspoonful of the former between meals, and ten drops of the tincture of chloride of iron after meals.

Our next object will be to hasten the separation of the dead and dying bone from the living by forcing a line of demarkation, where one is not already set up, by the application to the diseased parts of *sulphuric acid* of various strengths, as may be required. At this sitting, applied aromatic sulphuric acid to the left side of lower jaw. This was done every day to the 29th, thoroughly cleansing the parts, and applying sulphuric acid of various strengths, from the aromatic to equal parts of acid and water.

Oct. 29th.—Found the process on the lingual surface of the left side of lower jaw at the posterior point (said point being one-fourth of an inch back of the sixth-year molar), nearly detached; made the separation complete. From that point forward to where the second bicuspid would naturally be the necrosed bone had no attachment. Here made another separation, and removed the sequestrum. Also removed the transverse process, anterior and posterior, to the sixth-year molar. Applied aromatic sulphuric acid at all points; advised tepid salt-water baths and porter with the oil.

Nov. 1st.—As expected, the process on the buccal surface, corresponding to that removed at the last sitting, was nearly detached at the posterior point. In short, was in precisely the same condition, and treated in the same manner. This leaves the sixth-year molar entirely without support, except such as it may have from the soft tissues surrounding it. It seems to have *no* attachment. It certainly is exposed to the end of its roots, so that whatever attachment it does have is directly on the end. Applied aromatic sulphuric acid at all points.

Nov. 3d.—The soft tissues begin to show decided improvement, and the discharge of pus is much less. Up to this time have not been particular where the acid did touch, as it could not go amiss. Applied the acid now only at each particular point requiring it; this being as near the boundary of the diseased bone as possible. This is readily done by saturating a bit of lint with the acid and carrying it directly to the desired point, absorbing all moisture from the pocket previously. Have cotton ready to take up any overflow of acid. I say overflow, because it is desirable to have the pocket full.

Nov. 5th.—Removed from the right side of upper jaw the first molar, cuspid, their entire sockets, together with process, anterior and posterior, for three-sixteenths of an inch. Filled the cavity with cotton saturated with equal parts of sulphuric acid and water, keeping it there for fifteen minutes.

Nov. 8th.—Patient constitutionally much improved, and at all points where bone has been removed a decided healthy action exists; the remaining necrosed bone looser. Acid treatment as before.

Nov. 12th.—Extracted the right lower first temporary molar. Found the necrosed bone in its vicinity free, and removed it; the sequestrum extending from the lateral incisor to, and particularly involving, the process of the second temporary molar, and extending down on the body of the bone, on its labial surface, in a scale-like form, to nearly its lower border. Filled the cavity with cotton saturated with equal parts of sulphuric acid and water. In fact, treated it the same as the corresponding parts in the upper jaw. As I to-day see the result of that treatment, namely, the bone nearly covered, and that which is in view smooth and in condition to receive its natural covering, I can but think it the best treatment possible.

To-day the bone on the left side of the lower jaw, at the symphysis, inside and out, also on the labial surface, all the way along to the posterior point, seems to be detached; but on the lingual surface it is still attached at about the center of the lower border, being free at the ends. Applied sulphuric acid, one-half water, at the point of attachment.

Nov. 15th.—Found the sequestrum last described entirely detached, and removed it.

Nov. 17th.—The parts doing well, except at the symphysis; there the bone is rough. Applied sulphuric acid, one-half water, as in its present condition the advance of the soft tissues will not be kindly received.

At a point to be occupied by the right superior central incisor introduced a pledget of cotton in the opening in the gum, for the purpose of enlarging it.

Nov. 19th.—The bone at the symphysis is in good condition to receive the soft tissues, and they are already advancing upon it. Dressed with phénol sodique.

Removed the pledget of cotton from the upper gum, and extracted several spiculæ of bone, the larger being three-eighths of an inch long and one-eighth wide. Dressed with aromatic sulphuric acid.

Necrosed bone all removed; soft tissues in good condition. *In every instance, when dead bone was removed, healthy granulations were found beneath it.* Directed phénol sodique as a wash for the mouth.

Nov. 24th.—Nothing required; continued the oil, but changed iron to the syrup of iodide of iron.

The little fellow walked to the office, a distance of half a mile; has very little color yet, but is rapidly gaining strength.

The condition of the permanent teeth is as follows:

The incisors, cuspid, and first bicuspid on the left side of lower jaw in full view, held in position by the soft tissues only, all the bone having been removed from around them; the sixth-year molar firmer, in fact, safe; permanent teeth in view at all points where bone has been removed,—that is, they have been uncovered, except the superior central incisors, which cannot be seen, nor can they be found with a probe.

Case of necrosis and wasting away of the processes, caused by an abscessed superior left central incisor, the tooth having been filled over a dead pulp. Patient a young lady; age, twenty-five.

April 17th, 1876, made an examination, and found the process on the labial surface, from the median line to the posterior side of the left cuspid, gone or necrosed; the transverse processes between the centrals, central and lateral, lateral and cuspid gone; the diseased condition extending beyond the end of the roots of these teeth, involving the maxillary bone on its facial surface to above the base of the nose, leaving only the outer form or cortex of the anterior nasal spine intact; the gums engorged and purple, and readily lifted up, so that the ends of the roots of the central and lateral incisors were in full view. At the end of the root of the cuspid is a piece of necrosed bone, about three-eighths of an inch square, extending upward and towards the nares, free at all points except at the point of attachment at the end of the root of the cuspid.

We have now this condition:

The bone, from the median line to and including that on the anterior side of the cuspid, all wasted away, leaving the central and lateral incisors with no attachment, except a very slight one on their posterior surfaces; in fact, the central can be extracted with the fingers, the pulp in it being dead; the pulp in the lateral probably alive, the gum covering only about one-eighth of an inch of the root of the central and about one-half the length of the root of the lateral. The surface of diseased bone is on a line immediately posterior to the central and lateral, except directly at the end of the lateral, where the disease has progressed more rapidly, making a cavity not less than a quarter of an inch deep, and of about the same diameter. The bone dark and exceedingly rough.

The important question in this case is, Can we cause a reproduction of the parts and retain the teeth? Although advised not to attempt it, we hold it better to try and fail than not to try at all. Most certainly it would be bad practice to extract the teeth now. Patient ordered

Syrupi ferri iodidi, fʒiv;
Potassii iodidi, ʒii;
Aquæ, f℥i;
Syrupi, q. s. ft. f℥iii.

Cleansed the parts with tepid salt and water, and syringed with aromatic sulphuric acid. Following day same treatment. The next day, which was the 19th, stuffed the cavity with lint wet with sulphuric acid and water, one to four.

April 20th.—Finding the bone still dark and not perceptibly affected by the acid, applied equal parts of sulphuric acid and water. This treatment daily for three days had the desired effect of disintegrating or dissolving the surface of dead bone, so that it was easily removed. From this date the exposed surface of diseased bone was daily touched with the lotion of acid and water, until its whole surface was covered with healthy granulations; after which, from time to time, we syringed the parts with wine of opium or aromatic sulphuric acid, as seemed best. In the mean time we filled the pulp-cavity of the central incisor with cotton saturated with creasote, changing it every day or two.

About the middle of July the patient left for the country, the cavity being nearly filled up; the teeth much firmer, the gums healing nicely around them. Saw the case again about the 1st of October. It is a perfect success; the lost parts restored, the teeth firm, and the gums firmly attached to them.

My reason for trying to save the teeth was, that by their extraction at that time there must have been a permanent loss of structure amounting to a deformity. With the teeth to hold out the soft tissues, I might cause a reproduction and building up around them sufficient to make the deformity less, even if the teeth had to be extracted at a later period. Fortunately, the teeth are now quite as firm as the others.

Third case. A young lady, twenty years of age, had a superior lateral incisor filled about eight months ago. Some two months afterwards she complained that cold water caused pain in it. I said to her, "Try it awhile longer, and if it continues to trouble you, come in again." She did not follow my directions, and in the course of time went into the country. While there the pulp of the tooth became inflamed, died, and resulted in an abscess, which filled the entire roof of the mouth. When I saw it, September 15th, it was discharging freely around the two left bicuspids. The lateral incisor not loose, and no indication of pus in its immediate vicinity. I opened into the pulp-chamber, but found no pus there. I then made a small incision well back in the roof of the mouth, and by inserting the point of a syringe in the opening, and holding cotton tight around it, I could force its contents through the abscess and out at the point of discharge (the bicuspids), thus having a clear channel to wash through.

On examination found the bone on the left side, from the center to within less than one-quarter of an inch of the teeth, and extending back to the palate-bone, entirely denuded of its periosteum, its surface quite rough and disintegrated.

Syringed out well with tepid salt and water, then with aromatic sulphuric acid. Repeated this treatment the next day. After that used sulphuric acid and water, one to four, every other day for ten days, at the same time treating the root of the lateral incisor with creasote as usual in abscessed teeth. At the end of three weeks ceased the acid treatment, using wine of opium instead. At four weeks the case was discharged cured, the only evidence of disease being a slight thickening of the soft tissues in the roof of the mouth.

I might relate other cases, but the above are, I trust, sufficient to prove that we have in sulphuric acid an agent that makes conservative surgery, especially about the mouth and face, not only possible, but easy and sure, and one, if judiciously used, that will not affect injuriously either the soft tissues or living bone.

While on this subject I will add, that since 1871 it has been my practice to use sulphuric acid in many cases where I formerly employed chloride of zinc or creasote, and with far more speedy and satisfactory results. For instance, it is not unusual for us to find fistulous openings in the gums. These fistulæ, perhaps not always, but as a rule, are dependent on a diseased condition of the bone, and are quite formidable,—that is, they are very annoying to the patient still, not enough so as to cause them to submit to any operation that will give them pain; hence it has always been difficult for me to successfully treat them, but now by injecting aromatic sulphuric acid, perhaps twice (sometimes more), the cure is complete. Where a fistula is formed from an abscessed tooth, the acid will not only assist in subduing the abscess, but it will dissolve and smooth the ragged edges on the end of the root, thereby presenting a surface not entirely antagonistic to the advance of the soft tissues.

Dr. William Jarvie, Jr. I have been much interested in the recital of these cases, particularly as I have seen them from time to time all through their treatment. I saw the boy once or twice before the operation was commenced, and saw him almost continuously during the treatment. The two latter cases I have seen two or three times during the course of the treatment, and I merely desire to testify to the unexaggerated and very modest manner in which Dr. Hill has presented them.

Not a single feature of the cases has been overstated. I think, on the contrary, that in speaking of the amount of removed bone he has underestimated it.

On two occasions, with a rule, I measured the sequestrum. In one instance, I found he had recorded it to be but half its actual size, Dr. Hill judging from the eye, while I took the exact measure.

I might say one or two things about the boy, if the doctor were absent, which, I think, redound very much to his credit. I will say, however, that the child is of very poor parentage,—in fact, they were so poor that they were not able to provide sufficient nourishment for him, and consequently all that the doctor did in this case was without hope of fee or pecuniary reward.

There is another point omitted by him in the boy's case to which I wish to call attention,—viz., the effect of the acid upon the teeth.

As he stated, the germs or crowns of two or three of the teeth, now fully erupted and in place, were exposed and in full view, bobbing up and down in the soft tissues as they were touched. The acid, from almost pure sulphuric down to the aromatic, was frequently in contact with them, and yet, to-day, as I saw them, the teeth were perfect. Their enamel is not disintegrated in the least. Why is this? My theory is that the germs or partially developed teeth were covered with Nasmyth's membrane, and that the acid does not affect the soft tissues. You all know enamel coming in contact with slightly diluted sulphuric acid would be dissolved quite readily.

The child, at the time the case was first treated, looked as though he might die at any moment. His health now, however, is very much improved, and seems firmly established. In fact, he has stood the smallpox and the measles since. The only teeth missing are the first and second bicuspids on the left side of the lower jaw. There is no doubt whatever but that the first bicuspid is lost. I am not certain that the second bicuspid has erupted.

The last case spoken of by Dr. Hill I saw yesterday, and, as far as I could judge, everything is in a perfectly healthy condition.

Dr. W. H. Atkinson. I would like to emphasize the importance of our doing thoroughly anything which we attempt.

These cases are perfect proofs of what I have been saying to dentists for many years, as to the action of sulphuric acid upon the soft and hard tissues, and especially as to the electrical affinity which sulphuric acid holds to dead bone.

I think the delineation of these cases would pay us well for not only one night's listening, but for a whole winter's study. I congratulate Dr. Hill and the profession upon the success attendant upon this thorough and energetic mode of treatment. He has said several things gratuitously which I would like to take up and eliminate from the beauty and truth of the presentation of the case as a whole. One point I will allude to. He said the bicuspid had been developed without having any bony covering. If he had understood the law of development of the teeth better he would not have made that statement.

Dr. Hill. If I said that I did not intend it.

Dr. Atkinson. I have reason to know numerous instances where living bicuspids have been removed under such circumstances as that, thinking they were dead, when they were only attached to the soft tissues, and would sway about under the touch of the finger or instrument.

There has been a great deal brought before us to-night which it would be well to review, and sift that which is useful from that which is deleterious, but it is so late that I will not pursue the subject further.

Dr. W. H. Dwinelle. I feel that we have reason to congratulate ourselves in view of the exposition which has been made here to-night. In this connection I am reminded of a lawsuit, which is now pending, although it is pretty evident what the decision will be. It is a case in which an honest and well-intentioned gentleman of our profession is being prosecuted for paralyzing a lady's jaw by the use of the aromatic sulphuric acid of the druggists, and using it very moderately and carefully. The lady came to me to act as a witness in her behalf. Upon questioning her I found she was not paralyzed at all, but was merely after money. I declined to do as she requested. I was ready, however, in company with Dr. Atkinson, and one or two others, to give my testimony in behalf of the dentist.

The point I wish to make here is this: Dr. Hill has been using sulphuric acid of almost full strength, and using it properly and wisely, showing that while a dead part will be affected by sulphuric acid, judiciously applied, a living tissue may not be to its injury; showing, too, that the great principle of vitality which underlies the whole human economy will accommodate itself to the most extraordinary extremes—as we find manifested in many other directions. A vitalized body will endure cold down to eighty degrees below zero with impunity, and from some of our tests in the Turkish baths I have reason to believe that the human system is able to endure a temperature of two hundred and seventy degrees of heat with perfect safety. Whereas, strike out the vitality from the individual, and in one instance he is frozen to an icicle, and in the other he is cooked so thoroughly that he might be served up as a dish fit for cannibals.

I wish to relate a case in which, several years ago, I cautiously and tentatively used sulphuric acid, and with the most satisfactory results. The patient presented herself to me with all her lower teeth, from the second bicuspid on the right side to the second bicuspid on the left, inclusive, much diseased, the alveolar processes entirely necrosed in front, and the bone extensively affected. There was a profuse discharge of pus from every quarter. The most of the roots of the teeth were visible, and were also necrosed—dead. The alveolus was dark-brown and black. A prominent surgeon advised me to remove all the teeth, as he was apprehensive that otherwise they might cause the patient's death from pyæmia. I went to work, however, and removed all the dead bone, and commenced the use of sulphuric acid freely. I then resorted to amputation of the roots one after another. I amputated the lower third, the lower half, and even more of some of them. Of one eye-tooth, I amputated the lower two-thirds, and then cut it up obliquely to the margin of the gum.

I succeeded not only in checking all flow of pus but in reproducing all of the lost alveoli and gums, so that they covered the roots of the teeth as in their normal condition.

It was a singular fact in the case, that the periosteum and alveoli of the teeth along their *lingual* wall were unaffected by the disease, although in front they were almost wholly destroyed.

The result was that the lady retained her teeth in perfect order until her death, which occurred a few weeks ago, ten years after the operation.

Adjourned.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

At the regular monthly meeting of the above association, held at the hall of the Pennsylvania Dental College, on Tuesday evening, November 14th, 1876, the subject, "Abrasion of the Teeth," was generally participated in by the members present.

Dr. E. R. Pettit related the case of a young lady who came under his care, presenting abrasions upon both the labial and palatal surfaces of the upper front teeth. These surfaces were sensitive to an exalted degree, so much so as to almost preclude the contact of the instrument in their examination. The abrasions were not confined merely to the locality embraced by the festoon of the gum, but extended over the entire surface. Dr. P. stated he had recommended antacid washes, and had found these to act benignly. He had seen the case six months after he had operated, and found the sensitiveness almost entirely absent; but the grooves or gutters on the labial surfaces of the teeth, especially the front teeth, had the appearance of having been formed by the action of the brush in cleansing the teeth, softening of the enamel having previously been caused by the action of the saliva, which presented a decided acid reaction. Dr. P. asked for a general discussion of the subject, that information as to the proper course to pursue, as well as the means to combat this abnormal condition, might be elicited.

Dr. Buckingham asked if the sensitiveness was present in the front teeth alone, or if it extended to the back teeth also; if the patient enjoyed good health, or ill health, and of what age was she.

Dr. Pettit answered that the sensitiveness was present in the front as well as the back teeth; that the patient said she had taken acid medicines, and that she was from eighteen to twenty years of age.

Dr. Wert asked if Dr. Pettit had observed whether the lower teeth were more or less sensitive than the upper.

Dr. Pettit answered that the lower teeth seemed *less* sensitive.

Dr. Buckingham had seen children who had lost all the enamel off their teeth.

Dr. Pettit asked if this was from *all* the teeth, or only the front teeth.

Dr. Buckingham answered, from the front teeth. He questioned whether such cases were not the result of general systemic ill health, or perhaps brought about by the administration of acid medicines, thereby acidifying the system, and thus causing such depletion.

Dr. Pettit asked if the loss of this enamel seemed to be caused by chemical action, or if it seemed to be a scaling off of the tissue.

Dr. Buckingham answered, it seemed to be the result of chemical action loosening the support of that tissue and causing it to flake off. He found these teeth highly sensitive, and believed it to be produced by an abnormal condition of the saliva, brought about by systemic ill health; this secretion appeared to have a strong acid reaction on being tested with blue litmus-paper. He did not know how to combat it other than by the antacid washes recommended by Dr. Pettit, and by recommending such patients to the general practitioner for systemic treatment. Dr. B. said that there was another kind of abrasion noticeable in persons of more advanced life, quite different from that now under discussion, which he would take occasion to allude to later.

Dr. Pettit, on being asked, stated he had applied the blue litmus test in the case he had brought forward, and had found the saliva of a strongly marked acid character.

Dr. Chupein spoke of the cases, evidently alluded to by Dr. Buckingham, of the abrasion in the teeth on their labial surfaces above the festoon of the gum in persons of advanced age. He had seen these to begin from the first molar on one side of the upper jaw and extend to the similar tooth on the opposite side; the grooves or abrasions having an appearance such as might be produced by a half-round stump-file, and the points of the greatest depression being in the bicuspids and front teeth. These abraded surfaces were highly polished, and presented *no* sensitiveness. The cases he had witnessed were always noticeable in persons having remarkably good teeth. The enamel in these cases was but slightly encroached on, and this tissue sometimes presented sharp and jagged edges, sufficient to cut or wound the mucous membrane of the lips and cheek while talking or eating. He had not felt himself called on to interfere in such cases except to smooth off the sharp or jagged edges of the enamel, so as to prevent the laceration alluded to, as the condition produced no other discomfort, and as these abrasions sometimes extended to a considerable distance on the proximate surfaces of the bicuspids and incisors they called for operations of considerable magnitude and difficulty. While this condition seemed to be the result of some mechanical action, he could not assign any definite cause for it, or imagine how it was produced; as the abrasions nearly always assumed a semi-lunar form, much too narrow to be supposed to be occasioned by the vigorous use of the tooth-brush, he could not account for it as being thus produced. He has specimens of this kind of abrasion in his possession, and some of these are coated with large and thick deposits of salivary calculus, which would go to defeat the idea that they were produced by such use of the brush.

Dr. Buckingham had frequently met with cases such as instanced by Dr. Chupein. Within the last two or three days had had cases where the abrasions were of a cup shape on the masticating surfaces of molars which had *no antagonizers* and were apparently worn to the pulp. These surfaces presented a hard, glassy, polished condition, and were insensible to pain. When hard food was partaken of no discomfort ensued; but when partaking of soft food, a little pad or cushion of this would occasionally be forced into these cup-like depressions, pressing on some minute nerve-filament, which would produce such intense and sudden agony as to cause the patient to start as if struck to the heart. He did not think this condition was the result of chemical action, as this would not leave the hard, polished, glassy surface that these abrasions always presented. He could not determine how they were produced, as they occurred on surfaces where no apparent mechanical action had been instanced to produce them. In some cases these abrasions continued until the pulp was exposed. Sometimes nature counteracted this by a deposit of secondary dentine, thus protecting the exposed point; in others the pulp was laid bare, and mastication became torture. He knew of no remedy for the latter condition but the devitalization of the pulp and filling the pulp-cavity and root. As much as he deprecated this he was forced to do it to secure the comfort of his patient.

Dr. Wert had numerous such cases. He had his doubts as to any treatment being requisite when these surfaces presented a hard, polished condition, and when they caused no pain. Thought that where the pulp became exposed and caused pain it should be devitalized and extracted and the cavity filled. He believed that all the teeth became harder with age, and the abrasions on the labial surfaces of the teeth (except where they were very sensitive and caused pain) should not be interfered with unless to save the teeth.

Dr. W. H. Trueman suggested that this abrasion (referring to the grooves found at the neck, especially of the lower canines and bicuspids) may originate in defective structure. The dentine is less able to resist decay than either the enamel or cementum, and in those teeth where the enamel is deficient and does not overlap the cementum, it leaves a weak point liable to decay. In some cases nature resists the destructive agents; a change takes place in the dentine; it becomes more dense and resistant; decay is not stopped, but it advances very slowly, and if the tooth-brush is freely used the abraded surfaces are kept smooth and polished, and we have a groove instead of a cavity. He attributed the peculiar shape of the groove to the resistance offered by the enamel to the abrading agents. He called attention to the marked resemblance of these grooves to those worn by narrow clasps, and thought it probable they were both produced in the same way, viz., a mechanical and carious abrasion, neither of which alone would produce the result, but both working together under favoring circumstances. The term "chemical abrasion" is hardly correct when used to designate decay of the teeth. Caries is a pathological destruction, and not entirely dependent upon chemical action. He recommends in these cases—and in all where there is a marked tendency to decay at the necks of the teeth—the free use of prepared chalk just before retiring, allowing a little to remain about the teeth all night. It relieves the sensitiveness very much, and if persevered in very materially checks the tendency to decay. When objectionable, the taste of the chalk may be covered by adding borax, orris-root, vanilla, etc., or a weak solution of baking-soda may be used as a mouth-wash instead; but as this is in contact with the teeth only a short time, it is not as useful. While always recommending a soft tooth-brush and a judicious rather than vigorous brushing, he does not think it probable that a tooth-brush used with a suitable dentifrice will wear a sound tooth.

Dr. Chupein held different views, to a certain extent, from Dr. Trueman. He could not think that this abrasion was the result of defective structure (except in those teeth evincing great sensitiveness), as it was his experience to notice it only in those persons having excellent, hard, dense, and strong teeth of a marked yellowish cast. He likewise differed with him as to its being caused by the vigorous use of the tooth-brush, since the depressions were rarely over three-sixteenths of an inch in breadth, while the tooth-brush was seldom less than three-eighths of an inch wide. In cases of excessive sensitiveness he had recommended the use of prepared chalk mixed with water to the consistency of a thick paste, and in this condition daubed and forced with the end of the forefinger between the teeth and into these grooved abrasions just before retiring.

Dr. W. H. Trueman would account for the *narrowness* of these grooves as being produced by a *wide* brush by the elasticity of the bristles, and thinks decay in these places was the origin of such abrasions, and that these decayed places were arrested by vigorous brushing, from which brushing the high polish could also be accounted for.

Dr. Buckingham thought that if the cases cited by Dr. Chupein and accounted for by Dr. Trueman as having their origin in decay had commenced in decay these abrasions would present an irregular form, which was not the case. He had seen grooves like these produced by a clasp for the support of artificial teeth; but this kind of groove could readily be accounted for. It was these depressions on the labial surfaces of the front teeth and bicuspids, where no attrition was visible or present, that called for an answer as to how they were produced. In those that caused no inconvenience he would discountenance interference; but we wanted to know what was the best treatment for such as did give pain as well as for those which seemed to arise from an acid condition of the saliva.

Dr. E. H. Neall found the subject a very interesting one. In the last five years he had had some cases of the kind, which had given him considerable trouble. The whole labial surfaces of the front teeth were not grooved in a semi-lunar form, but appeared as if these teeth had been filed out with a flat file. He had sought to restore the contour of these teeth by drilling little pits at various angles and filling with oxychloride of zinc (his patient being too restive and too old for any prolonged operation or for the application of the rubber dam), but this had gradually washed out. The teeth being very sensitive and giving pain, he had endeavored to allay this by the use of chalk and antacids; but, although these had been faithfully and persistently used, the sensitiveness had returned. He had suggested gold, but his patient, although well-to-do, did not wish gold, as he said he had one of his teeth filled with gold and it had always given him great pain. He said that against his own convictions he removed the gold filling, and filled not only this but the other teeth with amalgam, and his patient had expressed himself delighted, and said he had had more real comfort since these fillings were inserted than for many years before. In one of these teeth he had been obliged to destroy the nerve.

Dr. E. R. Pettit had always attributed the grooves spoken of by many of the gentlemen present as being produced by the constant and vigorous use of the brush. He had observed them, but could not say that they always presented a semi-lunar shape. Most of those that had come under his observation were more triangular in shape.

Dr. A. H. Henderson related a case of this kind, and attributed the abrasions to the result of chemical action.

Dr. W. H. Trueman, while speaking of the wear of clasps on the teeth, stated he had recently examined an operation by Dr. J. A. Woodward, of this city, for one of his patients, on the plan proposed for the "permanent separation of approximal fillings" in the DENTAL COSMOS for June, 1875 (page 296). In this case,—two adjoining upper bicuspids with large contour fillings,—a gold wire was inserted in one filling and allowed to rest against the other, so as to keep them apart. The operation has been in about eighteen months, the gold wire has dug out the filling it rested against, and the teeth are so close it is impossible to pass anything between them. The articulation drives the teeth together, and the loss of the other teeth throws an extra amount of work on them, so the test was a severe one. It serves to illustrate the severe abrading force teeth encounter in daily use.

Dr. Buckingham said the case related by Dr. Trueman was not pertinent to the subject under discussion, neither were the triangular-shaped depressions spoken of by Dr. Pettit. He said those spoken of by Dr. Chupein were always found *above* the margin of the gum, where this had receded, while those alluded to by Dr. Pettit were found *on the enamel* on the labial surfaces, and not above the margin of the gum. In relation to the question of Dr. Neall, he did not know about the galvanic action of gold fillings. He thought gold fillings might be made too hard, although it was contended they could not be condensed too solidly. He must believe, in the consolidation of gold fillings, that the tubes on the surface of the dentine were mutilated by the violent action of the mallet in consolidating the gold, and thought this might be the cause of pain sometimes. Although he said this, perhaps he should not, for the accepted notion was that a filling could not be made too hard; yet he had seen fillings so soft that an excavator would readily perforate them, and for all this these fillings, to all appearances, perfectly preserved the teeth.

Dr. Pettit begged to correct Dr. Buckingham as to the cases of abrasion to which he had alluded. He said that those to which he had alluded were not in the enamel, but above that tissue,—the gum having receded in every case, the guttering, so to speak, being in the cementum.

The subject was then passed, and "Separating the Teeth" selected for the next evening's discussion.

Adjourned.

ALUMNI ASSOCIATION OF BALTIMORE COLLEGE OF DENTAL SURGERY.

The annual meeting of the Alumni Association of the Baltimore College of Dental Surgery will be held at the college building, Baltimore, Maryland, on Friday morning, March 9th, 1877, commencing at ten A.M. All graduates of this college, and others interested in dental science, are cordially invited to be present, and also at the Thirty-Seventh Annual Commencement, to be held on the evening of the same day, at the Academy of Music.

Samuel J. Cockerille, D.D.S., *President.*
William B. Wise, D.D.S., *Corresponding Secretary.*

CLINICAL REPORTS.

PHILADELPHIA DENTAL COLLEGE.

Operation by Dr. James E. Garretson.

REPORTED BY HENRY I. DORR, D.D.S.

October 6th, 1876.—The patient, a lady of about forty-five years of age, very nervous temperament, had been for some time a great sufferer from severe pain in the right side of the head and face, which pain was of a neuralgic character. She had been under medical treatment, and the efficacy of all known remedies (outside of surgery) had been thoroughly tested with only temporary relief. After a thorough examination, Dr. Garretson diagnosed the cause of her suffering to be dependent upon disorganization of the inferior dental nerve, a condition of which he spoke as being frequently met with by him. This nerve, as will be remembered, in company with the artery, passes downwards beneath the external pterygoid muscle, and then between the internal lateral ligament to the dental foramen in the ramus of the jaw. It then passes forward in the dental canal in the inferior maxillary bone to the mental foramen, which is just below and opposite the root of the second bicuspid tooth, where it divides into branches, which supply the teeth and muscles in that region. Removal of the contents of the canal having been decided upon, the patient was brought before the class, and, after a few interesting remarks upon the case by Dr. Garretson, ether was administered, and the operation performed in the following manner: an incision was made of about an inch and a half to two inches in length, and in a direct line of the shade produced by the turn of the face made in passing to the under side of the jaw, in order that the cicatrix should be in the least observable position. The facial artery, passing as it does over the lower jaw and upwards across the cheek, was severed by necessity of the anatomy of the region, and properly ligated above and below. With a small trephine the bone was penetrated to the canal (the jaw supported to prevent fracture), when with a chisel and a few taps of the mallet a necessary portion of the roof was removed. A small sharp-pointed instrument was then used to *scrape* out the nerve, the instrument being freely used so as to insure a thorough cleansing.

Dr. Garretson called attention to the fact that in such operations bleeding from the artery in the interior of the bone was likely to give trouble, and suggested that, as a precautionary measure, it would be well always to have a plug of soft pine-wood at hand in case of necessity. The hemorrhage in this case was easily controlled by a tampon of sponge saturated with alum-water, placed in the canal, and secured by a string. The surfaces were brought together, and retained by passing steel pins through to within about two or three lines of the head; then winding a ligature about the pins, forming the figure-of-8, the points being cut off,—these, in a few days, to be replaced by adhesive strips to support the parts. The dressing, under favorable circumstances, to consist simply of compress and bandage. After having the jaw bandaged to prevent hemorrhage, the patient started the same evening on a journey of four hundred miles.

This operation, of which but a crude idea is conveyed by the description, is one of the most delicate and satisfactory in surgery: it is often modified by Dr. Garretson, as he informed the class, by using a Hay's saw, with the aid of which the roof of the canal can be lifted off without any disturbance of its contents. Where a scar is a matter of consequence to the patient, the advantages of this over the old manner of operating are so great as to place it beyond any comparison. It was first practiced by Dr. Garretson about two years since.

BIBLIOGRAPHICAL.

MODERN THERAPEUTICS; A COMPENDIUM OF RECENT FORMULÆ, APPROVED TREATMENTS, AND SPECIFIC METHODS IN MEDICINE AND SURGERY; WITH AN APPENDIX ON HYPODERMIC MEDICATION, INHALATION, AERATION, AND OTHER REMEDIAL AGENTS AND THERAPEUTIC METHODS OF RECENT INTRODUCTION. By GEORGE H. NAPHEYS, A.M., M.D., etc. Fourth edition, rewritten and enlarged. 1 vol., cloth, 8vo, pp. 609. Philadelphia: D. G. Brinton, 1877.

The plan of the volume before us differs from all other books of its class, and as a ready reference is, we think, superior to any other. It is not a mere collection of formulæ, but an orderly, systematic presentation of the treatment of diseases by the most distinguished American, English, and Continental practitioners. The diseases are classified, and under each is given the treatment—generally the exact prescription—of several of the most eminent living authors and teachers, followed by a *résumé* of the drugs which are considered as efficient remedies in the special derangement under consideration.

One hundred and seventy-three diseases are thus noticed, and the recommendations and prescriptions of five hundred and eighty practitioners are quoted. As a compend of the literature of practical medicine for the last decade this volume will be found exceedingly interesting, instructive, and suggestive.

A full index of diseases, remedies, and authors facilitates reference to each, and enables the reader to find without trouble the information he seeks, whether from the direction of pathology, therapeutics, or authority.

The volume is handsomely printed on excellent paper and is well bound. It will be a valuable addition to any medical library.

OBITUARY.

DR. JOHN C. K. CROOKS.

DIED at Honeoye, New York, December 18th, 1876, Dr. JOHN C. K. CROOKS, in the forty-seventh year of his age. Dr. Crooks was a native of New York, a graduate of medicine, and practiced both medicine and dentistry; at one time in Michigan, and for the last six years in his native State. He had been in delicate health for a number of years. Dr. Crooks was much esteemed for his manly character and social qualities, and enjoyed the reputation of being skillful both in medicine and dentistry.

PERISCOPE.

Mercurial and Syphilitic Teeth.—Mr. Hamilton Cartwright read a letter from Mr. Salter, regretting his inability to be present, and said: Having recently had a conversation with Mr. Salter with regard to his views on syphilitic-mercurial and stomatitic teeth, I may perhaps be permitted to give a very brief *résumé* of his opinions. I believe that he quite coincides with Mr. Jonathan Hutchinson as to the existence of a peculiar type of tooth which is characteristic and diagnostic of hereditary syphilis, but he thinks that much evidence is wanting, even in those cases brought forward by that distinguished observer, to support the theory that mercury has any special action *per se* upon the teeth generally, or upon the six-year-old molars in particular. Mr. Salter also maintains that the cases are rare in which it produces stomatitis in children, and also draws attention to the fact—which my own experience most strongly corroborates—that the malformed teeth described as mercurial appear in people of all nations, whether that medicine be exhibited or not; whilst it cannot be denied that several years ago it had a far more extended use than now, and yet it is found that "rocky" teeth are no less frequent. In fine, his opinion is, I take it, that the (so termed) mercurial teeth do not necessarily indicate any other condition than that of depressed and arrested nutrition during the development, as proved by the layer of half-calcified dentine which underlies the craggy enamel. I believe that Mr. Hutchinson thinks that the first molars are particularly affected by mercury, but it must not be forgotten that these teeth are very prone to decay, indeed, their liability to do so is in the ratio of from sixty to sixty-five per cent. in the earlier years of life.

The Chairman. You had a very interesting discussion upon this question on the last occasion, but there was not time to finish, and it was adjourned until this evening. There are several gentlemen present capable, I am sure, if willing, to enter into the discussion of a most interesting subject,—interesting to us all not only as surgeons, but as practicing dental surgery also. There is a certain amount of diversity of opinion on every question, and that diversity makes these discussions the more interesting. Some gentlemen imagine that the peculiarities connected with the teeth which are strictly syphilitic are not always so patent as is represented or thought to be the case. Then, again, as to the mercurial teeth, no doubt you find teeth very much analogous in character that you cannot trace to any influence of mercury, arising, no doubt, from various constitutional disturbances in infancy. I have myself seen teeth, very much of the character represented by Mr. Hutchinson, that, so far as one can trace, were not at all the result of syphilitic disease in the infant. That is the question before us, and we shall be glad to hear remarks on this subject. Perhaps Mr. Hutchinson would be kind enough to state the peculiar character of the teeth that he thinks are due to mercurial influence.

Mr. Jonathan Hutchinson. I am extremely sorry both for the cause and the fact of Mr. Salter's absence this evening, for I believe he would have been able to state some important facts with reference to this question. In answer to the questions you have put, I should like to be permitted to repeat what I have stated strongly in print already, that I do not believe the teeth which I ventured to call "mercurial" are always mercurial; and that I quite agree with the opinion you express, that these malformations are due to a variety of causes occurring in infancy, which result in some congestion of the alveolar process and capsule of the tooth. Any condition of ill health which leads to inflammation of the gums and congestion of the alveolar processes and dental capsules, may lead to these effects in the malformation of the enamel of the teeth. Among the influences which most frequently do it, I believe mercury stands, by very far, pre-eminent, and that it causes the great majority of cases of malformation. It is only in that sense that I think the term "mercurial teeth" can be at all justified, as a term simply of convenience. I have said, in what I have written on the subject, that the term "stomatitis teeth" would be more strictly applicable; but I use the term "mercurial" for the sake of convenience, because I believe that mercury stands at the head of all other causes of dental malformation. I would suggest that the reason why the first permanent molar is, as dentists well know, the tooth to decay earliest is to be found in the fact that it is the first to calcify. It is the earliest in its development, therefore it is the tooth which is most likely to suffer if through any cause the child's health be deranged in infancy, and stomatitis result. If the child gets stomatitis from anything, there is its first permanent molar ready before the others, and in a state likely to receive damage, and hence the fact that it is observed to be in later life the most prone to caries. If I were to state what I think are the characters which are most reliable in practice, in order to the recognition of those who have taken mercury, or have suffered from some analogous form of stomatitis, I would mention first the absence of enamel on the surface of these four first molars. Some of the drawings I showed at the last meeting illustrated this very well. In some cases most of the other teeth were tolerably good; in almost all of them the two pre-molars, both in the upper and lower jaw, quite good, because they are teeth late in the process of calcification and development. The first permanent molar is the one which never escapes, if the others suffer. Next to the first molars generally go the incisors and canines, the central incisors suffering most severely, and next the lateral incisors, and lastly the canines. In cases in which the incisors almost or wholly escape, the most noticeable conditions are simply an absence of enamel on the surface of these four first molars, allowing of the projection of masses of dentine. These are more or less discolored, dark, and dirty-looking, and also somewhat spirous, having grown irregularly. This absence of enamel on the surface of the first molar I place first; and next to that, in all mouths in which the influence of stomatitis has been felt at all severely, will come the deficiency of enamel on the central incisors, lateral incisors, and canines. With these teeth I think it usually ends. I have in very few cases indeed found any material amount of defect in the formation of enamel on the other teeth. In contrasting mercurial teeth with syphilitic teeth I would say this broadly: that the syphilitic teeth are defective in general development, in size, shape, and every way, and show evidence of general atrophy and also of special atrophy of certain portions; but that the mercurial teeth show no general atrophy at all, and com paratively little of malformation, an interference with the development of the enamel being the chief feature. An absence of enamel, a rugged and dirty condition left by the denudation of the dentine beneath, and a rugged condition of the surface, are the chief features, and are far more likely to attract the attention of a casual observer than the less conspicuous, but far more important, syphilitic malformation. Hence it happens that the results of mercury are very frequently mistaken for syphilitic malformations. As regards the evidence upon which I rely that those are really due to the exhibition of mercury, I have very carefully questioned the parents of children in a great many cases, and the general result has been that we have been able to get in most cases a good deal of evidence as to the exhibition of mercury, and the amount of evidence has been generally in ratio with the severity of the defect of the development. Thus, wherever we have found very bad teeth indeed, we have almost always found the evidence very clear. Very often there has been a history of convulsions which had been treated by a large quantity of mercury. I mentioned at the last meeting that my attention had been mainly drawn to the matter in the investigation of a very peculiar form of cataract, known as "lamellar cataract," in which certain layers of the lens become opaque. By the observation of several different ophthalmic surgeons it has come to be pretty well established that wherever a child has lamellar cataract you will be sure to get the history of convulsions. A child is never born with lamellar cataract; "*congenital* cataract" is a different thing. Lamellar cataract occurs in early childhood, but is never congenital; and wherever you see a child with lamellar cataract you may guess back that there has been illness in infancy. I never saw a patient with lamellar cataract with really good permanent teeth; they all show these peculiar teeth which I have been describing. Now, I have been engaged some years in trying to find out what is the nature of the association which undoubtedly exists between lamellar cataract and pitted teeth. At one time I anticipated there was really some law of correlation of development between the lens and the teeth, and that the same influence which interfered with the nutrition of the lens of the eye interfered also with the development of the enamel of the teeth; but I got some marked facts showing that such was not probably the case. The following I may quote as a specimen: a surgeon from Aberdeen sent me up the cast of the mouth of a patient whom he had known from infancy. This young man is now twenty-one, and has perfect teeth in every respect, and yet lamellar cataract. This gentleman sent me the cast after my paper at the Pathological Society. He said he could state from his positive knowledge that this child had suffered from fits in childhood, but had never taken any mercury for them, so that the fits had produced lamellar cataract; but as there was no exhibition of mercury for their cure, the teeth had wholly escaped. We here have a fact very exceptional to what we observe in practice at Moorfields, where we almost invariably find the teeth defective when this lamellar cataract is present, and we get almost always some statement such as this in answer to our inquiries as to fits in infancy: "The doctor said nothing but calomel would stop the fits." In very many cases the mothers have given the statement that Stedman's soothing powders had been largely used on account of fits; or in other cases in which we have met with these teeth without the lamellar cataract, the teething powders have been given for some other cause. Of course I have met with exceptions. Being at the table of a medical friend in a country town, I could not help observing that his eldest girl had these "mercurial teeth" very badly indeed, and I was so much interested in it that I asked him if he would allow me to inquire into her history. Her teeth were very badly deficient in enamel, yet I was assured that, so far as he knew, the child had never taken any mercury whatever, nor was he aware that the child had ever suffered from any special form of stomatitis. This is the most definitely exceptional case I have met with, but I have met with a good many in which we could not say that we had conclusive proof that any large quantity of mercury had been given in infancy. Still, I repeat, the general result of my inquiries on the point has been to favor the belief that there is a connection between the use of mercury in infancy and this defective development of the enamel of the teeth,—admitting most fully that any other cause which shall produce stomatitis in infancy, at the same age, will produce precisely the same result. There is nothing by which you can tell the dental results of mercurial stomatitis from any other form of stomatitis.

Mr. Coleman would ask Mr. Hutchinson whether he had noticed a tendency in honeycomb teeth to become hereditary; he had observed many instances where such was the case.

Mr. Hamilton Cartwright. I should also much like to ask Mr. Jonathan Hutchinson, if he will forgive me for troubling him once more, whether he thinks that there should be actual ulceration of the mucous membrane to produce the so-termed stomatitic and mercurial teeth; and whether he does not think that in the one case it may be owing to mere congestion or inflammation, or, in the other, to the action of a special virus, leading to an arrest in nutrition, and a consequent imperfect deposition of osseous material; or does he think that actual stomatitis must be present?

Mr. Hutchinson. I believe these are what dentists term "craggy" teeth?

Mr. Coleman. We call them "honeycombed."

Mr. Hutchinson. I should rather have claimed the term "honeycombed" for the "mercurial tooth," since it is pitted irregularly; but when a tooth is very hard and everywhere covered with enamel, as these are, I should dispute its appropriateness. You see those in the diagram are white, quite to their free edge, evidently having their enamel on them, whilst they have transverse lines which cross the enamel. My observation respecting such as these has been exactly the same as yours,—that such teeth are often a family peculiarity. Two or three of the most marked cases I have seen have had just the history you have given, that it was a peculiarity which had been observed in several generations. I quite admit that some of these might have raised a suspicion of mercurial influence, but there is not a tooth figured there which I should have taken as at all characteristic of mercury, since they are all white, and none have really lost their enamel. They are the teeth which are described in my book as "craggy teeth," but not as mercurial. You must, however, if there is any doubt, look to the first molars and see how they are, for they are always altered in mercurial sets, and, I think, do not usually suffer in those which are a matter of family peculiarity.

Mr. McHardy. There is a case I have recently seen that I should like to mention; it is one Mr. Nettleship has seen with me, and by his permission I mention it. The patient presents certainly what I believe Mr. Hutchinson would confess is one typical upper central incisor—typical of inherited syphilis. It is that of a boy, fourteen years old, who suffered from well-marked interstitial keratitis on the same side as the syphilitic tooth. The corresponding tooth on the opposite side is in no way suspicious of inherited syphilis; it is a well-developed, sound tooth in all respects, and the case appears to me so unusual—I have never met with one before—that I think the society would perhaps kindly pardon me for mentioning it. I must regret not being able to bring a cast.

Mr. Napier. Is there any history?

Mr. McHardy. The history is distinct. He is the eldest of three living children. Both his eyes were affected by some spreading disease, probably interstitial keratitis,—that is about five years ago,—and he could hardly see. His mother has had seven pregnancies, and he was the result of the first impregnation, and was perfectly healthy as far as they believed. Only two children have lived since he was born.

Mr. Warrington Haward. A short time ago I had the opportunity of examining the teeth of a large number of children in the factory districts of Lancashire. Among these I saw no single case of notched upper permanent incisor teeth. In estimating the relative frequency with which these notched teeth, which Mr. Hutchinson has described as syphilitic, occur in children affected with inherited syphilis, one or two points should be remembered. I see among syphilitic children but very few cases of notched teeth, yet very many cases of syphilitic children die before the period at which these teeth are developed. Then, again, the children who are affected with inherited syphilis, and are brought under the notice of the general surgeon, mostly come to him for something else, and not for their teeth; and it is quite possible in many instances that the condition of the teeth has not been investigated. Again, the surgeon practicing dentistry sees patients brought to him because of their teeth, so that he might observe cases of notched teeth and fail to obtain the evidence of syphilis; whereas we general surgeons may be more prone to overlook the teeth, and yet to observe the syphilis. But from a careful observation of a great many cases of inherited syphilis, I can say that I have seen many, of the age at which the permanent incisors are present, in whom there were no notched teeth. That, I suppose, Mr. Hutchinson would say is the case. But I have never seen a case of well-marked notched permanent incisors in a patient who was not evidently syphilitic. With regard to the mercurial teeth, I am glad to hear Mr. Hutchinson repeat that this condition, which he attributes to the exhibition of mercury, may be produced also by other causes (not mercurial) which lead to stomatitis, for among the factory children I observed a great number of instances of the pitted teeth which Mr. Hutchinson describes, especially the pitted molar teeth, but had no reason to think that they were due to the exhibition of mercury.

Mr. Hutchinson. I will briefly answer Mr. Cartwright's question as to the stomatitis. I did not use it in the limited sense, or intending to imply only those forms attended by ulceration, but rather any disease involving a congestion of the gums and mouth generally. And I should quite agree with him and with Mr. Salter, that in the majority of cases there is no ulceration of the mucous membrane; it is generally inflammation of the alveolus. As regards effects occurring early in the first set, there of course we must examine as to the health of the mother. The state of the milk-teeth will probably depend upon what the mother took when she was pregnant. It would be very interesting indeed, and I think very possibly we may get cases showing what the result of the salivation of a pregnant woman in a late period of her pregnancy is on the first teeth. It is very likely we might get some light on the malformation of the first set from observation in this direction. I have been very much interested in the observations just made by Mr. Haward. I am afraid, however, that I can scarcely accept the theory of the sweetmeats, because I think the influence must be brought to bear upon the children too early in life,—usually, that is, within the first year.—*Report of Association of Surgeons Practicing Dentistry, in Medical Times and Gazette.*

(To be continued.)

HINTS AND QUERIES.

"NATURE does not vouchsafe an answer to a scientific inquiry unless the intelligent question be put, and the precise experiment made, as Bacon insisted, *ad intentionem ejus quod queritur;* and it is impossible to put the definite question, or to make the precise experiment, unless there be a prudently formed hypothesis in the mind,—that is to say, a hypothesis based upon previous careful training in observation of nature's processes and sound reflection upon them. The mind must be informed by patient and sympathetic intercourse with nature; it is enabled then to make new adjustments by means of the knowledge which it has gained through past adjustments,—to frame a new and true theory applicable to new experiences by reason of being stored with sound theories derived from past experiences. We shall do well, then, not to be too much intimidated by what is sometimes said or written in praise of mere observation of so-called facts, and in dispraise of theory, or imagine that any facts can be truly observed, or any science prosecuted with success, unless the well-trained mind co-operates with the senses. As I have said elsewhere, 'That some declaim so virulently against theory is as though the eunuch should declaim against lechery; it is the chastity of impotence.' Happy is the observer who, when he sets to work, has a good theory in his mind. The mischief is when men theorize who have not been trained in habits of accurate observation, or, I might go a step further and say, who have not inherited from father or grandfather in the foundations of their nature the lines of veracity of observation and thought on which to develop; for when one notices how persons of a certain eager temperament go on discovering facts which are no facts, and, notwithstanding that they are brayed in the mortar of an annihilating criticism, are not in the least benefited by the discipline, one cannot help feeling that the observer, like the poet, is born, not made."—DR. HENRY MAUDSLEY.

"A SCIENTIFIC discovery is only a means to an end. The cultivators of science seem oftentimes to forget that its end must be constructive; that after analysis must come synthesis; that all the analytical work in the world will leave matter in a chaotic state until the constructive spirit shall organize the incoherent results."—DR. HENRY MAUDSLEY.

"EVERY step taken by science may be made progressive if we be careful to select and grasp its points of real instruction and accumulate them as progress advances."—ERASMUS WILSON.

A MAN thirty-one years of age has all his teeth except the second left superior bicuspid, first superior right molar, and both inferior first molars, also inferior dentes sapientiæ, which have never been erupted. Owing to slight deformity of lower jaw, the second molars are the only lower teeth that come in contact with any of the upper ones, these striking so soon as to prevent those in front of them from meeting the upper teeth. In consequence of this the second inferior molars (which are perfectly sound) are fast wearing away, and are becoming more and more sensitive. I am particularly anxious that some experienced dentist will tell me what is best to be done in this case, as I am the patient.—D. S. THOMAS, *Somerset, Ohio.*

WILL some one who is accustomed to the use of A. J. Watt's crystal or sponge gold tell if they ever knew fillings made of it to discolor in the mouth?

Miss G., aged about twenty, called on me to have the left canine filled. I inserted two very large fillings of Watt's gold. She called again in about two months complaining of a bad taste from the fillings.

On examination I found the fillings discolored, having a copper color. The lady said they tasted like copper. I am not acquainted with the gold well enough to tell the cause. I have had one case of the kind before. Will some one give an explanation?—J. C. M.

I WOULD like to know how to prevent the dark mark showing in celluloid plates about where the air-chamber is usually located. A similar question was once before asked in this department, and the answer was given that the air-chamber caused it, but it happens with me in plates which have no air-chamber. Again, I have been told that it was caused by dirt being allowed to get on the plates, but I am very particular to wash the plates well with spirits of camphor. I use the steam apparatus.—J. M. H.

I HAVE a patient aged twenty-two who has been suffering for the past three years from an abscess of the cheek, situated opposite the second molar of the lower jaw, right side. The teeth are without defect, and I can discover no explanation of the trouble. Will some one help me?—R. F.

WILL some one please give the most reliable treatment of that threatening erysipelatous blush which is occasionally found to show itself on a swelled face after dental operations?—MAINE.

WILL some one who has experience explain the proper use of the Physick forceps?—that is, the relative position of the forceps with the teeth in the several positions for which it is intended.—S. C. M.

Is belladonna esteemed a cure for an aching, exposed dental nerve?—JOHNSON.

HOW TO TAKE A BITE.—In the December number of DENTAL COSMOS, W. B. K., Towanda, Pennsylvania, says the replies to George Dillon say, do certain things, then have the patient close the jaws; and then adds that the conundrum with him is how to know that the lower jaw is not thrown too far forward. For the benefit of W. B. K., George Dillon, or any professional brother who may have had trouble in this matter of taking a correct bite, I will give my own *modus operandi*, which is very simple but *sure every time.* Make base-plates of gutta-percha; cut a piece of wood about two inches long, one-eighth of an inch thick, and as wide as the desired length of the teeth; then place a rim of softened wax upon the ridge of each plate,—enough so that when the mouth is closed, the rims of wax on each plate will be pressed together and hold the plates in position; take your piece of wood, press it edgewise down through the wax on the upper base-plate, at the median line, letting it protrude forward about one inch; now insert plates in the mouth while the wax is yet soft; but before directing the patient to close the mouth have him sit bolt upright (if anything, inclined a little forward), and throw the head back far enough to see the ceiling directly over the chair in which he is sitting; direct him to close the mouth firmly, until you are satisfied that your piece of wood has cut through the wax and come in contact with the lower base-plate; take hold of the protruding end of the stick and direct the patient to open his mouth wide, and then draw out plates, wax, and all, fast together. A bite taken in this way *must* be correct, as any one can see by a trial that it is almost impossible to bite crooked while holding the head in the position above described.—G. M. MERRITT, *Jersey City, N. J.*

ANSWER TO OHIO.—The tumor described by your correspondent "Ohio" is, without doubt, a ranula of what is known as the frog-belly variety. That it cannot be a fatty growth is evidenced by the fluctuation which characterizes it, and that it is not an abscess is demonstrated by its age.

A ranula, when recent, presents the features of a fleshy bag filled with water; and this, indeed, is just what it is; its pathological signification residing in an accumulation of the salivary secretion in some one of the tubes of outlet, which tube, because of some reason which may or may not be evident, has become occluded.

In ranular cysts of some standing, as length of time is concerned, the tumors are apt to simulate the lipomata. This likeness finds explanation in an absorption of the more fluid constituents of the mass, the fatty portion of the saliva remaining and yielding the diagnostic expressions of the growths referred to.

Scirrhoma is also simulated by ranular tumors, these being found occasionally of a stony hardness. A description of such a tumor, in which the diagnosis of carcinoma had been made by a number of surgeons, is to be found in Garretson's "System of Oral Surgery," page 498. Conditions of this kind, while rare, are yet of sufficient frequency to compel the practitioner to bear them in mind. The difference, as result is concerned, between ranula and carcinoma is the difference between innocency and malignancy, between life and death. A case illustrative of the importance of diagnosis in such conditions occurred in the practice of the author just referred to, where a gentleman, a native of New York, but residing in California, was on his way to the place of his birth, under the impression, which had been given by his physician, that a tumor in his mouth was of cancerous nature and must shortly end his life. The diagnosis of ranula being established, an operation of simple character was performed, which resulted in a cure in the course of two weeks.

In the case described by your correspondent a method of treatment which commonly results satisfactorily consists in passing through the tumor several strands of silk twisted into a common string, or otherwise a piece of tape may be employed; this is to be allowed to remain until thrown off by nature.

A second method consists in cutting out a slight section of the cyst, and then cauterizing the boundaries of the cut surface.

Whatever the method employed, the principle of cure resides in restoring and in keeping open the closed orifice of the salivary tube.—A. B. C.

ANSWER TO INQUIRIES CONCERNING CARIES OF THE JAW.—The frequency of caries as a disease of the maxillæ renders an understanding of the clinical expressions of the condition a necessity to the practicing dentist.

Etiology.—Caries of bone is a disease implying the existence in the structure involved of an asthenic grade of inflammatory action. Asthenic inflammation is allied with the chronic and passive forms of nutritional perversion; caries is consequently a condition in which osseous structure is found softening and breaking down because of a deficiency in that which constitutes the meaning of the supporting vital force of a part.

That which is the supporting vital force of a part the physician is to recognize as consisting of a condition in which the functional offices exist in a fullness of energy and performance; a reverse to this implies necessarily that the process of destruction is not balanced by that of restoration.

A bone degenerated in its vitality to the extent of caries is in a condition very analogous to that of a soft part in a state of chronic inflammatory disintegration; the tissue may break down with great rapidity, or the process of destruction be so gradual that months or even years may elapse before the death of any very extensive territory is effected.

Caries is clinically divisible into the two expressions of moist and dry. Of these classes the former is much the more common; the latter the more deceptive and dangerous. In the former, moisture, and the presence of pus, conjoined not unfrequently with extensive fungiferous proliferation, sufficiently distinguish the presence and character of the disease; in the latter no sign may exist more observable than a fistulous orifice of the most diminutive diameter.

The pus issuing from carious structure—moist caries—is to be regarded, clinically, as expressive of the breaking down of the diseased tissue; in proportion to the quantity of this pus so is, as a rule, the extent of the disintegration.

In dry caries the writer has seen a whole superior maxilla riddled into a honeycomb-like mass, while externally so little evidence of disease has existed as to have been altogether overlooked; the integrity of the bone being destroyed before it was suspected that anything of importance was the matter. In cases of this character it is to be inferred that the organic substance has gradually undergone the process of liquefaction, and has been carried away by the absorbents, enough only being left to afford an imperfect support to the inorganic.

Diagnosis.—In caries of the jaw an easy confusion lies in confounding its diagnosis with that of alveolar abscess. To distinguish the conditions it is necessary to use a sharp-pointed probe; the ordinary dental excavator answers every purpose. In tooth-abscess the sinus leads to the implicated organ and does not reach beyond; in caries the extent and character of the disease discloses itself as being of other relation and expression. In caries of moist character the feature presented may be that of a large surface exposure, or the structure may resemble, as its permeability is concerned, a mass of cork. In dry caries the instrument conveys to the touch the idea of something that is porous or alveolar in its nature.

Local Treatment.—Experience directs that the safest, surest, and speediest means of cure lies in the performance of an operation; a full exposure of the involved structure is to be made, and the diseased part is to be thoroughly removed by means of a gouge or other instrument.

The use of acids, so highly lauded by Mr. Pollock, as well as by surgeons of our own country, is a slow means to the desired end, and is quite as often unsuccessful as the reverse. Unless when the timidity of a patient stands in the way, the treatment by operation is to be selected.

Constitutional Treatment.—The condition being expressive most generally of the asthenic state, tonics are indicated, the compounds of iron and bark being the preparations mostly employed.—A. B. C.

Reply to S. F. G., who asks, "What is the cause and treatment of the inflammation in connection with wearing rubber plates?" From his description of the case I should diagnose it one of mercurial inflammation, superinduced by the coloring material (vermilion or sulphide of mercury) contained in the rubber; which, having been brought in contact with the mucous membrane, has produced the condition described by S. F. G. In the treatment of this case, I would suggest that the patient be directed to discontinue wearing the plate for a while, and to paint the parts daily with the following:

℞.—Glycerina, ʒj;
Aquæ,
Acidum carbolicum, āā ʒss. M.

If, on the resumption of the plate, these unpleasant symptoms return, I would recommend that the plate be reconstructed in *black* rubber, when I am certain no more inconvenience will be experienced.—F. D.

Answer to S. F. G. concerning "Sore Mouth" from the wearing of Rubber Plates.—The pustular inflammation so often seen in association with the employment of rubber as a material for dental plates arises from the non-conducting character of this material, the underlying parts becoming overheated, thus inducing a grade of asthenic vascular perversion which it is found exceedingly difficult to combat; and which, indeed, in many, if not in most instances, finds a cure only with the removal of the offending cause.

As a local application the following combination, brushed over the parts twice or thrice daily, will be found to prove very satisfactory:

℞.—Tinct. capsici comp., ʒss;
Tinct. ferri chl., ʒij;
Tinct. cinchonæ, ʒj;
Quiniæ sulph., gr. xv. M.—A. B. C.

Answer to F. E. G., who asks "some one to explain the cause of air-bubbles in celluloid on being worked."

I think the "air-bubbles" you speak of are in the plaster and not in the celluloid. Use great care in plastering, especially in filling the last half, and I think you will not be troubled with "bubbles." Not enough care is used in mixing the plaster. Very often too much water is added, and it is then allowed to stand until it thickens sufficiently for use. This, in my experience, renders it chalky, and less dense than would otherwise be the case if properly mixed. Celluloid requires much more care in the manipulation than rubber, but its superiority over the latter amply repays for any extra pains or trouble.—W. F. S., *Winona, Minn.*

Reply to C. F. W., in January Dental Cosmos.—In 1873 a lady made a series of appointments with a dentist in this city, which she failed to keep. He brought suit against her for eighty dollars, charging at the rate of two dollars and fifty cents per hour. The case was tried before a justice, and a judgment rendered for the whole amount.—Chicago.

A. B. wants to know what change takes place in nitrous oxide when kept a few days, making it inert. No such change takes place with pure gas, provided it be kept *tight*. A very small *leak*, however, will allow of such an admixture of atmospheric air as to render the gas worthless in a short time.—EXPERIENCE.

IN answer to A. B., in the January number of the DENTAL COSMOS, would say, I think that it is freezing that renders nitrous oxide gas inert. I have never found any trouble in keeping it for quite a long time in warm weather, but in winter cannot rely on it at all if not made fresh. Cannot say what chemical action the cold has on it.—E. P. CUMINGS, *Grand Haven, Mich.*

A. B. IS informed that nitrous oxide gas does not change when kept over water except from absorption of the gas by the water, which becomes saturated very soon; after which there should be no change, except what gas may be lost between the receiver and holder,—usually so little that the gas may be kept for weeks without material deterioration.—M. C. S.

IN answer to J. W. W., will say I think liquid silex the best cement for mending plaster models; apply it to each part and put the parts together immediately, and it soon hardens and is strong.—E. P. CUMINGS, *Grand Haven, Mich.*

J. W. W. WILL find the cement to be liquid silex.—H. A. B.

TO STUDENT.—Bad packing and too high a heat in vulcanizing. Bring flasks together with boiling water. Whalebone rubber requires to be vulcanized at a lower heat than almost any other rubber I am acquainted with.—H. A. B.

REPLY TO STUDENT, who wants to know how to prevent the rubber from shrinking away from teeth in vulcanizing. The trouble is with your *plaster*. Try another kind.—C. E. M.

IF "Student" will have sufficient rubber in his mould, and wait, after vulcanizing, until it is entirely cold, he will have no trouble. It is not caused by the rubber drawing away, but either never being there or not enough to fill the mould.—M. C. S.

G. E. A.—Clean it well by putting into it a good-sized piece of beeswax, and run it into mould at a low temperature.—H. A. B.

IT is not probable D. Richey's theory is correct with reference to the tooth being a third molar. It is undoubtedly a supernumerary tooth, with a conical root not fully or at least normally developed; there would be no bad result from extracting it, and it will be easily done.—M. C. S.

ALLOW me to answer a few queries in the January DENTAL COSMOS.

1st. The cause of vulcanite shrinking from teeth is no doubt due to the presence of wax. Remove this entirely, have your teeth and models absolutely clean, and there will be no trouble.

2d. Why do some gold fillings turn dark? etc. It is undoubtedly due to the inferior quality of the gold or the presence of acid in it, if the kind used is crystal or sponge gold. Use foil only, and of the best make, and the trouble will be avoided.

3d. The best cement for plaster models is sandarac varnish of the consistency of cream.—J. H. WARNER, D.D.S.

SINCE making inquiry through the DENTAL COSMOS of December for a mode of working celluloid to prevent air-bubbles, I have found that my plates were burnt. I do not now adhere so closely to Dr. Watson's directions, and have no further trouble.—F. E. G., *Texas.*

Replantation Again.—Mr. Thos. Cahoon, a passenger conductor on Union Pacific Railroad running into Ogden City, Utah, came to my office about eight P.M., November 27th, 1875, saying, "Doctor, I've taken a severe cold on this trip, and just look at my face." I examined his mouth by lamp-light; found inferior left second bicuspid badly decayed on posterior approximate surface, tooth extremely sore to touch, and surrounding parts very much swollen. I attempted to open more thoroughly into the nerve-cavity, but it was too sore to admit of it, as he was suffering very much all the while. As he had to take the train out early in the morning I told him I thought it best to extract the tooth. He said, "*Doctor, I'll give you fifty dollars if you will save that tooth somehow.*" As he had not the time to devote to its treatment I decided to extract, fill, and insert again, and take chances for success. I made a weak solution of carbolic acid, oil of cloves, and glycerin; extracted the tooth (the alveolar socket was filled with pus), syringed the socket with the solution named, and had him hold tepid water in his mouth. I held the tooth with a napkin saturated with the above solution, while with an engine-bur I drilled from the apex through the root, cleansed it thoroughly, filled the point with gold, polished around point of root; filled body of root with Hill's stopping, and crown cavity with amalgam; syringed socket again with the solution; made it as dry as possible with bibulous paper, and inserted tooth with thumb and fingers, and told him to close his teeth tightly, holding a piece of wooden tooth-pick between the tooth and the one occluding, in order to better press it home in the socket, and prescribed hot foot-bath and an eight-grain Dover's powder before retiring. I did not see him again until 2d of December. The tooth was slightly tender to the touch only, and in a few days following he said it was as good as any other tooth in his head, except he felt a sort of dead sensation in the tooth when touched by his tongue. I have occasionally heard from him since, and he says the tooth is all right.

P.S.—This same gentleman in 1867 was, while fishing, attacked by the Sioux Indians, shot with eight arrows, scalped, and left for dead, his companion being killed,—without doubt a good subject to transplant teeth for.—Chas. W. Sellers, D D.S., *Cheyenne, Wyoming Territory.*

Chloride of Zinc, prepared and applied in the following manner, is being used by me with success—although not universal—for obtunding sensitive dentine, for which Dr. J. Foster Flagg, of Philadelphia, deserves the credit. The salt being spread on glass or porcelain, and a few drops of water sprinkled thereon, will soon deliquesce; let it stand until all, or nearly all, becomes fluid, then pour the clear liquid into a glass-stoppered bottle for use. Previous to introducing the zinc, cotton saturated with oil of cloves is inserted into the cavity and allowed to remain a few seconds; after drying with bibulous paper apply a drop of the deliquesced zinc on a small pellet of the paper or cotton, being careful to keep everything dry during the operation. A "bearable" pain will be experienced by the patient, which should be allowed to pass away before excavating. Before filling it is well to take *special* pains in washing the cavity. It will not be found necessary to repeat the application of the zinc more than twice in any one case if properly prepared and applied.—Jas. W. Kesler, *Honesdale, Pa.*

For the benefit of those who may have had the same misfortune that I have had in the breaking of thermometers while vulcanizing, particularly in cold weather, I would suggest that they cover the bulb of the thermometer with a piece of rubber tubing tied at each end, thus avoiding sudden changes of temperature. Might not the bulb be made of some kind of metal, and thus avoid the risk of breakage?—V. Dixon.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 62.)

Having, by the alternate and repeated morphia and arsenical applications, and the removal of one or more nodules, gained a complete entrance into the pulp-cavity, I have been most satisfactorily, and (as has been demonstrated by time) most permanently successful, by the adoption of that method which is technically known in general practice as "meeting the indications," and which may extend the treatment of one of these teeth over a period of six, twelve, or even eighteen months. If, therefore, a comfortable condition has been substituted for the former painful one, it is, at least, prudent to make, carefully, an acetate of morphia paste application from the end of a probe into the pulp-cavity, touching but not pressing upon the next proximate portion of pulp.

This should be covered either by a metallic cap (the recently devised Weston cap, with the *addition* to the vent-hole of the metal tongue for carrying it into position, impressing me as peculiarly suitable), or, should the experiment be deemed advisable, with any of the approved methods for conservation of pulp-vitality.

I admit the *possible* advantage of this latter course from considerations of respect to "conservatism," the beacon toward which I strongly desire to steer, and in the pathway of which I would place no obstacle; but I do not hesitate to state that my efforts in this direction *in these cases* have not been nearly so satisfactory as in those where I have maintained *steadily*, but *quietly*, the idea of eventual devitalization of the pulp.

It is not necessary that devitalizing medicaments should be continuously employed, although, in some cases, this has been forced upon me; but I have achieved better results when I have so treated as to obtund by morphia and quiet with oil of cloves, in the *hope of a gradual and painless death of the pulp*, than when I have bathed with creasote and capped with "oxychloride," with a view to permit of continuance of vitality and recuperative efforts on the part of this organ.

In two instances this latter treatment was followed by exceedingly severe *remittent* paroxysms, the first commencing in about six hours, and the second in less than an hour after the attempt, which paroxysms proved completely uncontrollable.

In the first case, after exhausting all ordinary treatment, the administration of ether and the thorough extirpation of the pulp, by broaching, was almost immediately followed by the resumption of severe toothache. After still further ineffectual efforts to relieve this by general medication and local applications to the face, consisting of hops, morphia, hamamelis, aconite, veratria, electricity, and galvanism, strong tincture of iodine to the gum as counter-irritant, together with consecutive applications of morphia, the oils of sassafras, peppermint, and cloves, in the now cleared canals, being careful not to so stop as to preclude *vent*, while outside irritation was guarded against, followed by the use of chloroform, locally, in the tooth and upon the face, and administered systemically to the obtunding of sensibility, and continued with a view to the establishment of a quiet which possibly might be maintained after the cessation of the general anæsthetic effect, and, as a *dernier ressort*, the employment of deliquesced chloride of zinc in the canals, the tooth was extracted.

In the second case the same ineffectual efforts were made, and, after extraction, the tooth was replanted. The appropriate local and general medication was indulged in, to the end that a tolerance of the tooth might be obtained. After about five hours it was found necessary to extract again; again it was replanted, but only to remain for about an hour. It was not deemed advisable to experiment further, although in this instance the patient was anxious to endure to almost any extent, he having already lost several teeth from this cause.

In both these cases "phantom" odontalgia has developed, and has continued, with gradual decrease in frequency, for seven and ten years respectively.

I have referred to deliquesced chloride of zinc as a *dernier ressort* in these two instances. The reason for this is the fact that in these pulp-nodule cases, while yet the canal portions of the pulp are still remaining undevitalized, containing nodules, irritated and productive of hitherto uncontrollable pain, *a heroic application of this medicament* (*deliquesced* chloride of zinc) will, after from *one to seven or eight hours of severe toothache*, sometimes "conquer a peace."

I have resorted to this treatment in several cases, and although by no means generally successful, it has been demonstrated to be sufficiently so to rank as worthy a trial.

In one case, nine years since, an interrupted galvano-electric current was passed through the pulp of one of these teeth (left inferior second bicuspid) for an hour and a half, until, upon removal, no pain supervened. It was not deemed judicious to attempt extirpation of the pulp so long as comfort was obtained, as the patient was an elderly lady (over sixty), and otherwise a neuralgic sufferer.

Nearly four years subsequently, during a sojourn in Washington, this tooth abscessed from putrescent pulp, ran the usual course of such trouble when not treated, established a fistulous opening, as usual, at the reflection of the mucous membrane, and was easily cured by simply cleansing and purifying the pulp-cavity, and immediately re-stopping the tooth, which during all this time had been filled with red gutta-percha. This is the only instance which I have upon record of a *seriously troublesome* case of nodular irritation ever having passed through that degree of external inflammation which resulted in *suppuration.*

In every other instance the pain was such, either neuralgia or *peri-odontitis* (prior to any termination), that the extraction of the tooth was imperatively demanded.

And now we have arrived at one of the most important considerations in this matter,—one upon which rests much of the future comfort of the patient; for *even more* than in connection with atrophy of permanent roots, we find this association of "phantom" odontalgia, to which I have *purposely* made *repeated* allusion, in order that I might impress the possibility, nay, probability, and indeed, *almost positive certainty* of its occurrence *if the tooth is extracted during a paroxysm of odontalgia.*

It is, therefore, of the greatest moment, when every effort has failed in giving the desired permanent relief, that much circumspection should be exercised to retain the *possibility of temporary obtunding for the purpose of extracting.*

It will be understood that this is *not* that obtunding which will render the *operation of extraction* possible without pain; but the obtunding of the special and general sensibility, *as already given* for preliminary preparation for nodular pulp-devitalization, and I would now *modify* the paragraph given in that connection, thus:

Having obtained the most perfect comfort possible under the circumstances, the ephemeral character of the relief should be fully recognized, *and the tooth should be extracted without delay.*

If the smallest portion of the root is fractured, this should be removed, for its presence has been proved to be sufficient to cause continuance of irritation.

A soothing application of acetate of morphia paste should be made, by placing it gently within the alveolus; in severe and doubtful cases, I think it advisable to mould a light gutta-percha guard, so as to protect the parts for a few days from accidental wounding and consequent irritation during mastication.

In conclusion, I would state that I have had the most *complete* exemption from all unpleasant sequences in those cases in which I have used *electricity* as the anæsthetic for extraction.

I mention this in order that it may be tried by others, should the usual general anæsthetic agents ever prove insufficient to the full accomplishment of entirely successful results.

Fungous Growth of the Pulp.

This term, "fungous growth," is given to that simple and benignant increase of size in pulp-structure which is due to complete exposure of that organ, conjoined with a degree of irritation insufficient to produce more than that increase of nutrition which results in morbid development.

The word fungus (mushroom), or fungoid (like a mushroom), quite correctly conveys an idea of the appearance of this disease, and I have thought it most appropriately introduced at this place, from the fact that it is the last pathological condition of vital pulp which can occur.

This condition universally occurs in persons of asthenic type, or who are the subjects of asthenic influences, and it is equally presented as a *chronic* condition.

The *appearance* of this growth is that of a bulbous piece of tissue, pink, red, purple, or blue, according to the moderation or rapidity of growth, the degree of irritation, the looseness of tissue, or the turgescence of circulation.

Its *location* is entirely within the confines of the open pulp-cavity, or encroaching in greater or less degree upon the cavity of decay, or resting upon the surface of a crownless root or roots.

The *sensitiveness* of these growths is varied, ranging from complete absence of sensation to exquisite sensibility, and upon this peculiarity rests the treatment in every case.

There is, however, always a preliminary step in these cases, which is, the obtaining of a positive knowledge that the fungous growth is of pulp origin, *for an ingrowing, or fungous gum, often presents exactly the appearance of fungous pulp, together with an almost equal variance of sensibility.*

When it is desired to save the tooth, if possible, in connection with which this complication is found, it is first necessary to cut out or press out the bulbous portion of the fungus; if devoid of sensation, or only moderately sensitive, this is easily accomplished, and the bulbous portion of the pulp-cavity is then filled with pellets of cotton dipped in sandarach varnish.

These should not be pressed in too tightly, and yet sufficiently so to exercise the required force for retaining the advance gained, until hemorrhage shall have ceased and the parts assumed the contour due to pressure.

By the next day the cotton can be removed; and this should be done gently that further bleeding may not occur, when an examination can be made which shall definitely determine as to whether the growth arises from the canals, and is therefore *pulp-fungus*, or whether there may possibly be some outside connection which may prove it *gum-fungus.*

In cases of undue or extreme sensitiveness, the same treatment, by pressure, is resorted to; but in these the pressure is gentle in proportion to the existing tenderness, sometimes beginning with a pellet of cotton no larger than a pin's head; and the pellets are to be moistened with morphia paste, or with *dental* tincture of iodine (ʒiii iodine, ℥i alcohol; solution effected by shaking several times daily, for a week or two), according as pain-obtunding or constringing is most indicated.

The reason for this precaution is, that when *fungous pulp* is finally diagnosed, the usual arsenical application will complete the treatment prior to extirpation; while in *fungous gum* that application would almost certainly result in outside devitalization, with probable loss of the tooth, possible loss of adjoining tooth and some jaw-structure.

The safe plan is always to treat as if the growth were *fungous gum*, until by the visual or instrumental test, or better, by *both*, it is proven to be *fungous growth of the pulp.*

It is by no means necessary that an arsenical application should always be made in these cases, for there is sometimes not sufficient tenderness to compel it.

In such instances the immediate devitalization by pressure or puncture (which will be referred to in place) would be resorted to.

Devitalization of the Dental Pulp.

One of the most remarkable of the many anomalies of dental practice is the general lack of *special* information in relation to, and the absence of *harmony* as to *belief* in, the advantages and results of this "ancient and time-honored" operation.

To our modern apprehension, the ideas of those gentlemen who wrote upon this subject a hundred years ago* are crude, but it is certainly curious to note the directions which were given at that early period for the cure of such cases of odontalgia as were attributable to the dental nerve.

Beside the constant reference to the efficacy of the *oils of cinnamon and cloves on pellets of cotton*, we find minute descriptions of the method of opening into the pulp-cavity (" trépaner"), together with the whole process of taking the life of the pulp, by means of the broach, with all the precautions of " drawing the temper" from the instrument, " in order that danger of breaking off in the tooth may be avoided."

It is stated that " should this occur, the removal of the broken fragment would be impossible," and a consequent material interference with the success of the proposed operation would ensue.

It was at that time also enjoined that " a thread should always be tied to the broach and held by the fingers of the operator, lest the instrument might slip from his grasp and be swallowed by the patient.

Primitive as are these teachings, it nevertheless shows a recognition of the possibility and advisability of pulp-devitalization.

The progress which has been made since that time is such that the whole subject is so minutely worked up as to form one of the marvels of modern special pathology and therapeutics.

Recognizing, with singular extent and precision, the systemic, anatomical, physiological, pathological, and therapeutic complications of this very important operation, it is reduced by the competent dentist of the present almost within the confines of exact science.

As is the case with every other method, means, or material which constitutes a part of dentistry, a seemingly endless discussion continues in regard to this procedure; but, as the degree of departure from normality is so great, under some conditions of pulp-irritation, as to preclude the possibility of such control as to secure the continuance of its vitality, with exemption from suffering, it becomes the only means by which to save, even temporarily, the affected tooth.

This being true, it is of the first moment that we should clearly appreciate that the dental pulp is not an organ " vital" to the welfare of the general economy, but that, like an eye or a limb, it may be removed for cause.

At the same time it should equally be appreciated that it is vastly more to the vitality of the tooth than is the eye or the limb to the whole body, and thus while one should never think, much less speak, of a pulpless tooth as a *dead tooth*, he should never forget how *very much less* than a *truly living* tooth is such a maimed and mutilated organ.

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* The operations of a century since are stated by Fouchard to be " the cleaning of teeth; their separation; their shortening; the taking away of caries; their cauterizing; their filling; their straightening; their arranging; their tightening; *their trepanning;* their extraction; their replanting; their transplanting, and the introduction of artificial substitutes." Fouchard, at that time, had been in practice for thirty years.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.—SIXTEENTH ANNUAL SESSION.

(Concluded from page 82.)

THIRD DAY—*Afternoon Session.*

THE subject of Therapeutics was still under discussion.

Dr. Barker. In the last year we have had several therapeutic agents made known. The author of the report ignores a paper on sulphites and hyposulphites, by Dr. Jas. Lewis. Since that paper was written he (the speaker) has been using these substances with success in alveolar abscess, necrosis, retrograde metamorphosis, etc. He would call attention to salicylic acid. Though all the hopes in regard to it have not been realized, yet it has valuable uses. It is very useful for diseased gums, etc.

Dr. Atkinson. The aberration of function is the seat of therapeutics. The seat of nutrient activity must be the seat of activity of repair, and that is in the cells, but not in the cells *per se*. Nutrition is a cell act, consisting of imbibition by the law of endosmosis, and exhalation by exosmosis; but while the pabulum is in the cell a change takes place, of which it is useless to describe even the crudest conception. No pathologists except himself have taken the ground that secretion and excretion are moulting acts of serous cells. All the tissues must be nourished by fluids or semi-fluids; they cannot be sickened or nourished by solids, except by catalysis. In this case it may be done without waste of the catalytic agent itself; musk perfumes a drawer for years, and is not itself dissipated.

Dr. Barker. Imbibition, or passing of substances through cell-walls, is nothing new. These epithelial changes are well known. The paper said little about changes after adult life. We can hope for good results even then. He has a case in which the teeth of a lady, previous to marriage, were in perfect order. She had nursed her first child up to within a few weeks of the birth of the second, and now the fillings can be removed from her teeth with a hair probe; the teeth are like a cheese-rind, showing a great deficiency of osseous tissue. There is no anæmia in this case, and the patient enjoys fair health. If he were to perform operations other than of a temporary character in this case he would rob the patient. He is filling with Hill's stopping, and administering syrup of lacto-phosphate of lime, three tablespoonfuls a day, and sees a marked improvement in the teeth. Consolidation does take place after adult life.

Dr. Dixon. Changes do take place after adult life; there is no duty more incumbent than observing the changes that take place after that. He has seen startling cases, and is more fully convinced than ever that such changes do take place. Teeth that seemed to promise that they would not need the services of the dentist, in eighteen months required to be filled in a dozen places. No dentist can say that teeth will last even for a year. He had had no experience in the use of the hypophosphites.

Dr. John S. Smith, of Columbia, Pa., corroborated these statements. This is an important subject, which will, at no distant day, have a marked influence upon the production of better natural dentures. Syrup of lacto-phosphate of lime should be used with a two-fold purpose. Time is necessary to build up the pabulum of the blood, until nutrition crowns the effort to restore.

Dr. Dean. Arsenic has received a good deal of attention as an antiseptic. Twenty days ago he (the speaker) had taken a quantity of fresh veal and covered it with arsenic; it soon became offensive from putrefaction. At the same time he covered another piece with glycerin, and there was no putrefaction. He had also taken three pigeons, two of which he poisoned with arsenic, and the other he killed, and hung them up in a shed. On the seventh day, the one which had not taken arsenic became filled with maggots; the others had to be buried three or four days afterward. He had also experimented with frogs. In one, two grains of arsenic were injected into the thigh; it lived about six days, and the viscera upon being analyzed showed no arsenic, and became offensive. The arsenic was administered to the other frog internally, and the viscera showed crystals of arsenic upon examination, but subsequently became offensive.

Dr. Hunt, of Washington. The question of waste and repair is a mooted one, not so much as to the fact as the extent. The lacto-phosphate of lime may be a valuable therapeutic agent, but it is not as assimilable as other forms. We cannot in a laboratory place any materials in a proper condition of assimilation; the only way is to have them passed through nature's laboratory. We should approach the products of nature as nearly as possible. He had been rendered conservative by experience, and had failed to realize the *ne plus ultra*.

Dr. Dean said that the conclusions from his experiments had been that arsenic is absorbed and taken into the circulation, and that it was no arrester of decay. Water, meat, and arsenic, in a bottle, had putrefied in ten days.

Dr. Kingsbury. From analogy, waste and repair of the dental tissues may be considered a well-established fact. In a normal condition the pulp possesses circulation, and there is no reason why these changes should not take place. The best method of inducing repair is open for experiment. He had had hypophosphites prepared for testing their effect upon the teeth, and had come to the conclusion that they were not assimilated in an appreciable degree, and was disappointed. The forms of food in which the phosphates are contained are best adapted to build up teeth.

Dr. John Allen. Therapeutic agents from nature's laboratory act more surely than those from the laboratory of man. Where is the man who can reproduce the diamond, though he may obtain the element of which it is composed? We do not meet with results from the hand of man such as we obtain from nature. He is quite positive that it is better to rely on the natural substances, such as the hull of grain, which will be assimilated.

The subject was then passed.

The subject of Mechanical Dentistry was taken up.

A paper, by Dr. W. N. Morrison, was read, which simply called attention to a porcelain pinless tooth, said to be the exact shape and size of nature's productions, recently patented by Dr. W. P. Hall, of Piqua, Ohio. The shapes are what we have long and earnestly desired; we want teeth resembling nature in shape, color, and good masticating surfaces, particularly in bicuspids and molars, regardless of what they may cost. Our object should not be so many teeth for so much money, regardless of how well they may imitate nature. With the old specimens we have compromised our professional dignity, making every dentist ashamed to own that he pretended to be a mechanical dentist at all.

A report by Dr. W. C. Barrett, chairman of the committee, was read by Prof. D. D. Smith. The following is an abstract of the report:

Dr. Barrett's report was entitled "Cheap Bases for Artifical Teeth." The writer said that in the choice of material for a base, the cost was not, with many people, the least consideration. It should be our aim to place artificial substitutes within the reach of the laboring man, who must in this be governed by the same laws as in other things. He cannot dress his family in silk; cotton must therefore be adopted; and the same principle holds with regard to the teeth. All dentists cannot work for rich patients, but our most skillful ones might as well be translated to a higher sphere, so far as their usefulness to the lower classes is concerned. The greater portion of the people must confine themselves to necessities, and choose the cheaper of indispensables, and if we, as a profession, would fulfill our mission, we must conform ourselves to these conditions. There is then an imperative demand for a cheap base, which many efforts have been made to supply. Our hopes have been excited by impracticable metals and moonshine schemes to fabricate silk purses from sows' ears.

Not till the advent of rubber did it seem that a step had been taken toward the desired end ; and even with this material it was soon found that the dental millennium had not been reached. Rubber was liable to certain objections, though in the hands of competent men it has served a useful purpose. Unfortunately, its cheapness and ease of manipulation, while placing artificial teeth within the reach of all, has brought into dentistry an entirely new class of dentists, who, with their little carpet-bags, perambulate the country, and carry their wares to every door. Their accomplishments have been confined to the wholesale extraction of natural, and the insertion of artificial teeth; and while they have wrought much mischief, they have for all time established the certainty of cheap dentistry. This condition of things we must accept, and as true men endeavor to bring about a more healthy state of affairs.

Rubber has been enthroned as king; but, like many another monarch, it has fallen completely under the domination of its prime minister, Bacon. The royal monopolies have become so great as to be intolerable. We have in vain struggled to free ourselves from them, and there remains for us nothing but the dethronement of the monarch himself. Dropping the metaphor, we should choose for a cheap base that which is open to the fewest objections. Practically, there are but two, rubber and celluloid. In comparing the two we find that, organically, there is but little difference, while in some of their characteristics they widely differ. Both are moulded in a matrix, but the one is hardened by caloric, while the other is rendered plastic.

The paper then proceeded to compare these bases in their several characteristics. In density it was stated that neither has much the advantage. There is an impression that celluloid is porous, and likely to absorb the fluids of the mouth. With some of the material that has been furnished this may have been the case; this, however, is the fault of the manufacturers.

In hardness, rubber is superior. In tenacity or strength, celluloid has decidedly the advantage. This is an important point, and is amply proved; it is, besides, more elastic. Rubber is the heavier of the two. In cleanliness, there is little difference; both are moulded around the teeth, and not being liable to shrink from them in any degree, no spaces are left. Their powers of transmitting caloric are nearly equal; both are poor conductors, and this is one of the chief objections to them. In ease and pleasantness of manipulation, celluloid has considerable advantage. Rubber presents fewer obstacles to the bungler, but celluloid is more easily manipulated by the expert. In adaptability, there is little to choose from. The cost of each is about the same. As to durability, there has not been sufficient time to fully test their rival merits. An experience of two years appears to prove that, with perfect material, celluloid will not be inferior. In appearance, celluloid has immense advantage; its color is infinitely better than that of rubber, and when perfect material is used it has not been found that it changes materially with use. It is quite possible with this base to use plain teeth, carving the gum into a close imitation of nature, restoring lost contour, and breaking up the detestable monotony and mechanical appearance of gum sections. In congeniality, either to the mucous membrane or the feelings of the dentist, there is almost no comparison. From its very nature, rubber is unsuited for close adaptation to delicate tissues. A tight-fitting rubber shoe or glove is very uncomfortable. From this objection celluloid seems to be free. Red rubber also contains a large amount of vermilion, which, while it may not mean free mercury in the plate, increases its tendency to irritate. Celluloid has a minute proportion of this pigment, and has, in this, undoubted superiority.

The objections urged against this base have been, its alleged change of color, its occasional absorption of the oral fluids, and its warping when not in actual wear. The complaints of failures in manipulation are urged against every other base by the awkward, and may fairly be attributed to lack of skill. The charge of lack of stability, if fairly proven, would be fatal. But this charge of warping has been found to be unsustained. Plates have been subjected, out of the mouth, to the most violent changes of temperature, without the fit being changed at all. It is a pity that the manufacturers have not exercised greater care in the sending out of blanks. Imperfectly seasoned and badly-colored plates have been sent out, and have mainly fallen into the hands of those inexperienced in the use of the material, and thus the base itself has been brought into disrepute. The fact that the demand for plates has been greater than the ability of the company to supply, doubtless accounts for their failure to condemn their imperfect material, and it is to be hoped that in the future the standard will not be allowed to deteriorate. Taking into view all its qualities, and leaving out the question of freedom from monopolies, the conclusion is that celluloid has the potentialities which should dethrone rubber, and establish itself as the best of the cheap bases.

The subject being open for discussion,

Prof. D. D. Smith said it might be well to take a retrospect of this branch of dentistry, to see where we stand, and if possible from this time, this centennial year, take a new departure. Mechanical dentistry is in a lamentable condition; it receives no countenance or encouragement from the best men; they have, to use their own expressions, "washed their hands of it." The result was seen in a fact which he would relate. A graduate of a dental college had written to one of the professors to ask what he would construct a set of continuous gum work, *mounted on rubber*, for? He did not know enough about continuous gum work to know the base on which it was constructed. Many have not even seen it. There seems to be little except rubber, rubber. In 1867 or 1868, Dr. Atkinson had declared that rose pearl would one day supersede every other material for partial sets. This prediction had not been fulfilled. There is a demand for mechanical dentistry: many patients are thrown entirely upon its resources. We must supply the demand. We are not always able to preserve the natural organs; in many instances their loss is certain, not alone by decay, but by a disease with which we cannot grapple, viz., absorption of the process and loosening of the teeth. Until we can preserve all teeth, let us not say that mechanical dentistry has no place among our discussions. Complaint was made in one of the papers that there was not sufficient variety of teeth manufactured. The plain teeth now made for celluloid work probably cannot be surpassed. Gum sections are artificial in appearance, and yet he knew of an instance where one party ordered, at a single time, two hundred dollars worth, all of a single mould. Among the metals, gold, an alloy of platinum and iridium, and platinum may be used for bases. Iridium and platinum is stiffer than gold; silver even is better than vulcanite for partial sets. Then we have Weston's and Moffitt's metals, and the mineral base, which is very beautiful; there are sets of it that could not be purchased from the owners; but there are grave objections pertaining to its manufacture. Then we have the vegetable compounds, vulcanite and celluloid. The appliance, of whatever material it is made, must be fixed in the mouth, must admit of distinct enunciation, restore the features, and be so allied to the natural organs in color, shape, and general character, as not to be readily distinguished as artificial. There is now very frequently an entire want of harmony between the substitutes and the individual. Does not the packing of gold sink into the smallest insignificance compared with true dental prosthesis? Can true restoration be accomplished by the bases and teeth now at hand? It cannot, with sectional teeth and rubber. Gold with soldered teeth is better, as it presents a much more pleasing appearance, but it is objectionable in regard to spaces under the teeth. Allen's continuous gum work has its advantages and also its disadvantages; but the latter are so small we must place it in the very front. The weight within certain bounds is no objection, except as the plate is a misfit. This work accomplishes everything as to naturalness, cleanliness, and masticating surface. There is one other kind of work, metallic plate with rubber attachments, which possesses all the advantages of continuous gum, except as to appearance, which is its disadvantage. It possesses all the advantages of soldered work, and none of its disadvantages.

The subject was then laid on the table, and the next, Etiology, taken up and opened by the reading of a report from Dr. D. C. Hawxhurst, chairman of the committee, of which the following is a summary:

1. The maxillæ of civilized races are smaller than those of savage races, who were their ancestors. This has come about through slow changes that have taken place in the environment during the last few thousands of years, through the influence of which there has been a hereditary transmission of a small increment of decrease to each successive descendant.

2. The teeth have felt the influence of this changed environment fully as much as the jaws, but not in the same way. They have dwindled less than the maxillæ, are therefore too large for the maxillæ, and suffer from unnatural pressure.

3. The wisdom-tooth has suffered from this disparity between the size of the teeth and the jaws more than the other teeth. Coming last of all the molars, it has had to take what space was left after they were satisfied. It is slowly becoming rudimentary.

4. The inability of the hard parts of the teeth to respond in size to their lessened function, or in other words to keep pace in retrograde evolutions with the jaws and with their own soft parts, has resulted in weakened structure of these organs, and deserves to be reckoned among the causes that predispose to decay.

Dr. M. H. Webb, a member of the committee, also read a report, of which the following is an abstract:

Etiology is that department of science which treats of the causes of disease. Atoms and cells may not combine properly, hence the tissues will not be normal, and this is a predisposing cause of disease, and the agency of an exciting cause induces a manifestation of disease in such imperfect tissue. Imperfect development is well exemplified in dental tissues; enamel rods fail to fuse, and a sulcus is formed, into which particles of food are impacted, and serve as a cause of caries. The researches of Dr. S. B. Palmer on this subject seem to show that acids form salts with the tooth-substance, which salts are readily decomposed by the saliva. Decay continues so long as the causes that induced it remain the same, but may be arrested by the formation of insoluble salts. If continued, it reaches the pulp, and irritation of this tissue is caused, which produces odontalgia. The immediate cause of this may be the agents which caused the disintegration, or it may be the infringement of foreign substances upon the exposed pulp. If it depends upon acid it should subside upon cleansing the cavity and introducing an alkali. Should it be caused by foreign substances it should cease upon their removal. If the cause is continued more intense pain may follow, and cognizable disease ensues, resulting eventually in the destruction of the pulp. The derangement of the pericementum following this is evanescent, and a tolerable condition is again established. Devitalized tissue soon putrefies and gives rise to gases which have an irritating influence upon the soft tissues; if such gas escapes through the apicial foramen, it causes irritation of the periosteum; the nutrition of the tissues about the apex is interfered with, a separation of cells is caused, the gas is absorbed by the watery exudations from the capillaries, and incipient alveolar abscess is pronounced. This condition may result in absorption of the contents of the abscess (an example of complete resolution), leaving no trace; or it may disappear, leaving an insoluble mass of collapsed epithelial scales, caseous corpuscles, etc., which may be encysted and tolerated indefinitely. Or the changes may be so rapid as to infiltrate all the territory of the locality, and choke off all circulation, when stony hardness ensues, and phlegmon is established. If there be an accumulation of pus-corpuscles, distention of the parts takes place, followed by severe pain and absorption of the alveolus, which continues until the contents of the sac are discharged. So long as the contents of the pulp-chamber are retained, abscess will periodically take place; a constant pus-generating surface may result which it is quite difficult to get rid of, in which case a chronic abscess is established. This condition interferes with the supply of the elements upon which the periosteum depends for nourishment, and its vitality, as well as that of the dependent cementum, is finally destroyed, leaving the tooth in a necrosed condition. Unless a line of demarkation be made by nature, death of the alveolar periosteum may ensue, causing necrosis of the alveolus, or even of the maxillary bone; the antrum may be invaded, and even still further complications may arise, if the cause inducing the abnormal condition be not removed.

Dr. H. L. Sage, another member of the committee, also read a lengthy report, of which we give a brief abstract:

Etiology may have a wider signification than a mere consideration of the exciting and predisposing causes of dental caries. Inflammation of pulp or periosteum is a pathological condition, and may exist without caries, or it may predispose to it by lessening vital resistance in the dental organs. Abrasion, spontaneous or mechanical, may be an exciting cause of disease, as may also undue acidity or alkalinity, and also salivary deposits. Systemic conditions, as anæmia, nervous disturbance, etc., are greatly influential as regards the condition of the teeth and alveoli. The causes of dental disease are of two classes, predisposing or vital, and exciting or chemical, the former having reference to imperfect structural development, and the latter to influences subsequent thereto, as external chemical agents. Imperfect development may be dependent on infantile disease which interferes with nutrition, which is most manifested in the higher stages of civilization. A deficiency of lime-salts in the blood of the mother during gestation and lactation might also predispose to caries; great deterioration of the blood of the mother frequently occurs, resulting in loss of the teeth. The natural changes which the teeth undergo may also modify the action of caries; as age increases, the liability to this is lessened, and by structural deterioration it is increased. May not a too rapid growth of the body cause a deficiency in the teeth by a disturbance of the proper balance of materials? The territory to be supplied may be increased in extent so rapidly that the blood shall fail to furnish sufficient nutritive material to supply the demand, thus inducing imperfect development. Adult life may bring with it a denser condition of the teeth, but usually the injury is then accomplished. The fearful deterioration of children's teeth is apparent to all, both as regards caries and irregularities. These latter effects have been attributed to a want of harmony in the development of the physical and nervous systems; an undue state of nervous activity, the mental predominating over the physical, induced by a forcing of the intellect. Imperfect physical organization may also be the cause of deterioration of tooth-structure. Hereditary transmission has much to do with it, combined with the artificial habits of life, which are increasing with each generation. The penalty of the violation of nature's laws has thus become transmitted; the sins and follies of the parent are visited upon the children. The truth of this statement is growing more apparent daily. Nervous disorders are becoming alarmingly frequent. Another cause of dental disease may be an excessive calcification of dental tissue; the closure of the tubules will prevent nutrition, produce an excess of mineral ingredients, and the teeth will tend to become foreign bodies. This class of teeth is usually associated with pulpy gums and crescent-shaped deposits of very hard tartar at the necks, which cuts off the supply of pabulum from the periosteum, causing loosening of the teeth. In these cases, if too free use is made of caustic agents, rapid and extensive destruction of the gums is caused thereby. Spontaneous abrasion of the teeth is ordinarily supposed to be the effect of acid secretions. In some cases there appears to be a combination of spontaneous and mechanical abrasion. Is it not possible for the latter to take place without the contact of the opposing teeth? Shallow, saucer-shaped cavities in the posterior teeth appear to have been produced by chemical agents, when in reality the effect is merely mechanical. The two may exist together, but the concavities may have been produced by the contact of seeds, food, etc., with the dentine after the enamel has been worn sufficiently to expose it, and if so this abrasion would be purely mechanical. In one case of this kind, when these cavities were exquisitely sensitive, this condition was relieved by the application of carvacrol, of full strength, for a period not exceeding two minutes. The inferior molars which had no antagonists were not abraded, as might have been the case if the cause was chemical. The cavities sometimes observed at the necks of the bicuspids and molars, appearing as if cut with a half-round file, would appear to be a product of chemical action; they exist in the highest type of teeth, and in cleanly mouths, where caries exists sparingly. The exciting cause of this is not plain. It may be asked, however, whether the condition is not the work of the resorption cells, to which allusion has been made by Chase (*Missouri Dental Journal*, February, 1875), and may not much of the so-called spontaneous abrasion be due to the same cause?

The local and constitutional effects of certain medicinal preparations on the teeth is a subject worthy of investigation. It is well known that medicines containing acids do have a deleterious effect on the teeth by local action. Their exhibition has become so frequent, and that too in many cases without the means necessary to neutralize them, that many teeth are greatly injured, if not ruined thereby.

That excessive, long-continued, and, in some instances, brief use of some alkaline preparations, notably the bromide of potassium, has an injurious effect upon the teeth, is very probable, whether combined with acid oral secretions or not, though enough is not yet known to warrant positive conclusions on the subject, inasmuch as when these drugs are required the systemic conditions are unfavorable to the teeth. The effects of disease are so inseparable from the use of medicines that it is not easy to decide whether the loss of tooth-substance is dependent on one or the other, or both. That the long-continued use of chlorate of potassium may prove injurious, was indicated in a case which came under the observation of the writer. A young patient, of good constitution and well nourished, had used this medicine periodically, for a throat affection, up to her eighth year. Previous to doing so, she had an exceptionably well-developed denture, but the molars soon began to decay, until it became necessary to fill eleven cavities. These were all in the lower jaw except three, thus reversing the usual relative frequency of decay, and apparently going to show that those teeth most easily washed by the chlorate (the lower molars and bicuspids) were most affected; a theory strengthened by the character of the teeth, the well-developed organization of the child, and the healthy condition of the gums and oral fluids. Headland says that this drug, no matter where introduced into the system, quickly reappears in the saliva, to which fact is due its specific action. If this be true, the saliva would have been impregnated with the potash, and the teeth constantly subjected to its action. To the fact that alkalies act upon the cartilaginous and fatty constituents, is due the absence of sensitiveness in such cases. In the above case there was very little sensitiveness. In another case of a young man whose mouth was excessively alkaline there was a similar lack of sensation. In this case the gums were much thickened and inflamed, and tests with litmus paper indicated the presence of a volatile alkali, probably ammonia, thrown off by the decomposing organic substances. If this substance is produced in the mouth to excess by these agents (as it is in other localities), why may it not, by acting upon the animal portions of the dentine, produce caries of a more or less destructive type? The presence of the agent in this case was established, and the absence of sensitiveness gives force to the view. May not the action of alkalies upon the teeth be explained by the fact that they act (as was stated by Prof. Summers at a meeting of the American Dental Association) by disintegration, while acids act by combination; that is, that the alkalies dissolve the organic matter of the teeth, causing the ultimate breaking up of the mineral substance, while the acids combine with the inorganic portions? Or the action may be indirect, if, by combination with oral secretions, destructive agents are formed. A case illustrating the effects of alkaline remedies upon the teeth, was that of a lady who was under medical treatment for nine years, during most of which time the bromide of potassium was administered, and at the same time deterioration of the teeth commenced, and continued until they were mere wrecks. She also took bromide of sodium and muriate of ammonia, but took no iron or acid preparations. The fact that nutrition was interfered with would account only in part for the almost total destruction of the teeth, and it is evident that the bromides were the main cause. The method, degree, and directness of action of these salts may depend upon the acidity or alkalinity of the oral secretions; they may act directly by seizing upon the organic portions of the teeth, or indirectly by forming hydrobromic acid by combination with acid oral secretions. The writer had seen other cases tending to the same conclusion in regard to the effect of bromide of potassium upon the teeth. It has been stated by Dr. Black, in a paper read before the Illinois State Dental Society, that black decay is usually found associated with alkaline saliva.

Besides ammonia, sulphuretted hydrogen gas is frequently thrown off in the mouth. Dr. Black, whose experiments were cited last year by Dr. H. A. Smith, attributes the different colors of decay to the precipitation by the sulphuretted hydrogen of certain sulphurets, the color being influenced by the acidity or otherwise of the oral fluids. This theory was apparently sustained by the experiments of Dr. Black, in which he found that in teeth submitted to an acid solution, through which a stream of sulphuretted hydrogen was passed, different colors of decay were produced, according to the acidity, or otherwise, of the solution, the black color appearing when the solution was decidedly alkaline. In the last-mentioned case of medication, the color of the decay was decidedly black; hence we may infer that an alkali was the exciting cause of the caries. It may be said that the bromide is a neutral salt, and so it should be; but several specimens produced by celebrated makers, upon being tested with litmus, presented in every case a decided alkaline reaction. The iodide of potassium from a reliable house behaved in a similar manner, and it is probable that this, as well as bromide of ammonium and similar preparations, act deleteriously upon the teeth. The *color* of caries may thus be indicative of its cause when the history of the case is known. Carbonic acid is also a product of decomposition, and is present in the mouth, both by evolution and as a product of respiration, but whether in sufficient quantity to prove destructive to the teeth is a question. The experiments of Magitot and others, cited by Wedl, where by subjection to seltzer water the teeth became softened and friable, would suggest that such might be the case. The carbonate of lime is soluble in carbonic acid, and the phosphate of lime sparingly so, and if they were seized upon and disintegrated, caries would be originated.

Alkalies dissolve fibrin and fats, and cause spareness of the system, thus hindering nutrition and causing wasting and malnutrition of the tissues. May they not thus produce systemic effects, by which the teeth are rendered more susceptible to or less capable of resisting chemical action? In some diseases, as fevers of a low type, as malarial, typhus, and typhoid, and malignant scarlatina, the blood is supposed to contain an excess of alkali, and the treatment of these diseases by acids has been successful. Does this excessive alkalinity, supposed to be due to ammonia, act chemically, as well as systemically, upon the teeth? Dr. Watts is reported as saying that when ammonia is in excess, caries is more likely to result than if the fluids of the mouth were slightly acid, which he explains by saying that nitric acid results from ammonia, causing white decay.

The development of oral organisms, in connection with caries, has led to a consideration as to what part they play, if any, in the destruction of the dental tissues. While some consider them to be the originators of the disease, the weight of evidence seems to indicate that they are merely consequences of it. Profs. Peirce and McQuillen favor such a view. Lieber and Rottenstein regard the leptothrix as a cause of caries, or at least that a mere surface breach of the dentine being effected, these fungi penetrate and proliferate, and, if the decay is at all extensive, participate in the destruction. They assert that the action of the acid is necessary to the penetration of normal enamel, and that in dry caries it is the sole active agent. Wedl considers that the death of a considerable portion of dentine by acids is necessary for the penetration of the fungi, and that they have no direct connection with the origin of caries, though they may be active accelerators of decomposition. To recapitulate, the origin of caries is, in the opinion of most writers, dependent upon the abnormal secretions of the gums and other portions of the oral mucous membrane, as well as upon the lodgment about the teeth of putrescing and fermenting animal and vegetable matter, which, decomposing, produces acids which extract the calcareous salts from the mineral portions of the teeth, while few deny that vital action is also influential in promoting or retarding the disease. Many hold with Prof. Garretson that caries is a chemico-vital action, of hereditary transmission and predisposition. He regards it as an inflammation similar to caries of bone, modified by the difference in structure between the two tissues. If the bones were exposed to the direct action of chemical agents as the teeth are, they would be likely to suffer as frequently from the same cause. But few writers of note seem to recognize that alkalies exert any direct action upon the teeth. That the action is limited must be admitted, and that they act at all may not be proved; but enough has been stated to indicate that they may do so in certain cases in a degree modified by various surrounding circumstances. The action of alkalies upon the system as a predisposing cause has not apparently received any attention in order to determine whether any such influence exists, though vitality must be affected by the acids or alkalies with which the system may become charged, and the character of organs thereby changed. It is difficult to separate the chemical from the vital theory, or admit one to the exclusion of the other, if we regard the part taken by these forces in the impairment or maintenance of the dental tissues, since, if action is normal, the nutritive functions will enable the teeth to resist, to a greater extent, the effects of chemical agents.

Adjourned.

Evening Session.

This session was devoted to the selection of place of next meeting and election of officers.

Upon the fourth ballot for place of next meeting, Chicago was selected.

The election of officers was then proceeded with, with the following result:

President.—George W. Keely, Oxford, Ohio.

First Vice-President.—C. N. Peirce, Philadelphia.

Second Vice-President.—Corydon Palmer, New York.

Corresponding Secretary.—J. H. McQuillen, Philadelphia.

Recording Secretary.—C. Stoddard Smith, Springfield, Ill.

Treasurer.—W. H. Goddard, Louisville. Kentucky.

Executive Committee.—(new members) G. H. Cushing, J. N. Crouse, A. L. Northrop.

Adjourned.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the society held at the residence of Dr. W. St. G. Elliott, No. 63 West Fifty-fourth Street, Tuesday evening, November 21st, 1876.

President A. L. Northrop in the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. W. H. Atkinson. I have a case of exposed pulp, which may be interesting. Some months ago I capped it with oxychloride of zinc. A little more than a month ago it began to ache. I then removed the oxychloride, dressed it two or three days, and covered it with ordinary sheet gutta-percha. In about a week I removed that, and then saw a projection of nearly transparent, colorless, apparently connective tissue, which was soft, and looked like the rugæ of the skin on the ball of the finger. After touching it with the oil of cloves and creasote, I formed a pasty mixture of this preparation and the oxide of zinc and covered it, filling up the rest of the cavity with the ordinary oxychloride of zinc. A few days ago, the patient complaining of pain in the tooth, I removed carefully the oxychloride filling, when a point of exposure, which I had not observed before, presented itself. That portion of the oxychloride of zinc next the white part, which was mixed with the preparation, was not stained as it usually is. It was a little colored when I put it in, but that color was gone, and there was no line of demarkation between that and the oxychloride of zinc pure. After removing the filling entirely, I examined the cavity carefully. There was an absence of sensibility, which led me to doubt if the pulp were living. I found the exposed place perfectly solid, filled up apparently by sound secondary dentine; but upon cutting and trying it with warm and cold air, I obtained very palpable evidences of sensibility. I then dressed it with oil of cloves and creasote, and the patient went away perfectly comfortable. What puzzles me is, to know why it should be painful during the presence of oxychloride of zinc and be relieved by its removal.

The president suggested that this deposit of secondary dentine may have been continued up to the foramen, impinging in the pulp on nerve filament, so as to excite a neuralgic affection.

Dr. Jno. B. Rich. Of all the methods of mixing amalgam that have been suggested, preparing it in the palm of the hand with a horn spatula is the most satisfactory method to me. To prevent the mercury from coming in contact with the skin I use this device which is on my hand. It is a piece of very thin sheet-rubber, about eight inches square, with holes punched in it (of such size that they will be moderately tight) for the insertion of the thumb, the index and little fingers. These holes must be placed in such positions that the rubber will be smooth on the palm, and project some distance over the whole hand.

Dr. E. A. Bogue. I extracted a tooth this afternoon because of its looseness. There was in it a gold filling, and underneath the gold was gutta-percha. The whole thing was put in by a gentleman well known to all present some fifteen years ago. The decay that was left over the pulp seems to be in the same condition now as it was fifteen years ago. The pulp was living.

The President. I notice, in examining the piece of rubber exhibited by Dr. Rich, some little holes which excite my curiosity; will he kindly explain their purpose?

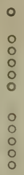
Dr. Jno. B. Rich. The piece of rubber referred to is a specimen of a system of numbering I invented many years since, and which in this case is applied to number the pieces of the rubber dam I use, so that I may know to which patient each one belongs. I will try and explain this system, which, although very simple, and easy to use when understood, I apprehend will be difficult to explain without the assistance of diagrams, and I will premise the attempt at description by stating that I have a piece of rubber dam for each patient, whose name is entered in a book opposite a number corresponding with the one marked in this way on the rubber.

To indicate the number, according to this system, several imaginary lines are used, on which small holes are made with an ordinary rubber-dam punch. For the numbers from one to ten inclusive these holes are arranged on a horizontal line, running from left to right, close to, and parallel with, the upper margin of the rubber. The first hole of this line is to be located in the angle of the left-hand upper corner, close to the left-hand margin.

To determine which are the margins named, and the right and left corners, a single hole is punched in one corner of the piece of rubber, and that corner so punched becomes the right-hand upper corner, while the corner to the left, on the same line, becomes the left-hand upper corner, and in this left-hand upper corner the holes are located that indicate the numbers. Each of the holes punched on the horizontal line represents a unit, the first hole to the left indicating number one, the next to the right of it number two, and so on until the number ten is reached, which is the greatest number that can be recorded at one time on this line.

When these units amount to more than five they are divided into two sections, the first being composed of five holes, and the second section of the remaining holes on the line, with a space equal to the width of two holes between the two sections. This arrangement of the holes into sections will greatly facilitate the counting of them.

For numbers greater than ten, and up to and including one hundred and ten, two lines of holes are used, the additional line running in a perpendicular direction downward; this line runs close to, and parallel with, the left-hand margin. The first hole on this perpendicular line is always to be placed immediately under the first hole of the horizontal one, at a distance of the width of two holes below it. This can always be done, as by this system no number can be indicated without there being at least one hole on the horizontal line. These two lines are used in combination in the following manner: ten being the limit that can be designated on the horizontal line, when a greater number is required the holes that represented the first ten units must be considered as having been removed from the horizontal and transferred to the perpendicular line, and as being there represented by one hole, leaving the horizontal line entirely free to receive the holes needed to indicate the number required, always bearing in mind that a ten cannot be carried to the perpendicular line until it becomes necessary to remove it from the horizontal one, in order to make room for the holes that are to indicate a greater number than that already recorded. As instances of the operation of this principle, we will suppose the number ten is the one to be recorded; it will be indicated by ten holes on the horizontal line, thus, $\circ\circ\circ\circ\circ\;\;\circ\circ\circ\circ\circ$, but the number eleven is indicated by one hole on the perpendicular line, which counts ten, and one on the horizontal one, which counts one, thus, $\begin{array}{l}\circ\\ \\ \circ\end{array}$, the space between these two holes showing to which line they respectively belong; number twelve, by one hole on the perpendicular and two on the horizontal line, thus, $\begin{array}{l}\circ\circ\\ \\ \circ\end{array}$; twenty, by one hole on the perpendicular and ten on the horizontal line, thus, $\begin{array}{l}\circ\circ\circ\circ\circ\;\;\circ\circ\circ\circ\circ\\ \\ \circ\end{array}$; twenty-one, by two holes on the perpendicular and one on the horizontal line, thus, $\begin{array}{l}\circ\\ \\ \circ\\ \circ\end{array}$ twenty-two, thus, $\begin{array}{l}\circ\circ\\ \\ \circ\\ \circ\end{array}$; one hundred, by nine holes on the perpendicular and ten on the horizontal line, thus, $\begin{array}{l}\circ\circ\circ\circ\circ\;\;\circ\circ\circ\circ\circ\\ \\ \circ\\ \circ\\ \circ\\ \circ\\ \circ\\ \\ \circ\\ \circ\\ \circ\\ \circ\end{array}$; one hundred and one, by ten holes on the perpendicular and one on the horizontal line,



thus, ; and so on to one hundred and ten.

For numbers greater than one hundred and ten, and up to one thousand one hundred and ten, another imaginary line is used, situated to the right of, and running parallel with, and close to, the first perpendicular line, and formed on the same principle, and holding the same comparative relations with the first perpendicular line that that line does to the horizontal line, each hole on the second perpendicular line counting one hundred. The ten holes on the first perpendicular line counting one hundred, which is the greatest number that can be counted on it, are transferred to the second perpendicular, and are there represented by one hole, when it becomes necessary to transfer another ten to the first perpendicular that has been completed on the horizontal line; so that two hundred would be indicated by one hole on the second perpendicular line, nine on the first perpendicular, and ten on the horizontal line. Two hundred and ten would be indicated by one hole on the second perpendicular, ten on the first perpendicular, and ten on the horizontal line; two hundred and eleven, by two holes on the second perpendicular, one on the first, and one on the horizontal line. In the same way a third perpendicular line would count thousands, and so on. The plan of dividing the holes into sections should be applied to all the lines.

About a month since I was consulted by a physician in relation to the case of a patient of his that was very sick, confined to her bed, suffering from a tooth that had been extracted and reinserted about six weeks before I first saw the patient. As this treatment to relieve toothache is at present exciting some attention, the details of this case may be interesting to the meeting. The patient, who is a lady about fifty years of age, was, while attending at the Exhibition in Philadelphia, attacked with severe toothache in a second lower molar. She bore the pain for two or three days, and when, as she said, she could not stand it any longer, she resolved to have it out, and for that purpose one of her relatives living there took her to their family dentist. The dentist examined the tooth, and told her he could save it for her, but to do that he must extract the tooth and put it back again. He assured her in the most emphatic manner that by the treatment proposed she would be immediately freed from pain, and the tooth would soon be all right again. The lady was in great agony, the dentist was sure of his plan of treatment, and she reluctantly consented to have the tooth treated as the dentist advised. The tooth was extracted, immediately reinserted, and she went home, to suffer almost unbearable agony the whole night.

The next day, still suffering, she started for the West, and returned to this city, quite sick, the day before I was consulted. She told me she had suffered from this tooth continuously since the dentist put it back in its socket. I found the parts around the tooth in a high state of inflammation, the gum tumefied, of a dark-purple color, and a discharge of fetid pus from the socket when the tooth, which was very loose, was pressed upon.

I recommended that the tooth be immediately removed, as I considered its condition dangerous to her. Both her physician and husband used all their eloquence to persuade her to follow my advice, but she would not consent, and I retired from the case. Two days since I heard from her physician that she was still in the same condition.

Dr. B. Lord. I have occasionally referred in our meetings to the value of tin-foil as a stopping. Within a week I have seen two persons for whom I have operated for thirty-six years. One of them, a lady, has a tin-foil filling in the grinding surface of a molar. There is not much wear upon it, to be sure, but it has preserved the tooth perfectly for over thirty-six years, it having been placed there before I took charge of her mouth.

The other, a gentleman, has tin-foil fillings in his teeth which I put in over thirty years ago, and those fillings are good. The more I see of the effects of tin, and the more I use it, the better I like it. In approximal cavities, difficult to get at and difficult to keep dry, I believe it is the very best material that can be used,—I like it better than amalgam, and I think it makes a more perfect stopping. With suitable instruments it can be packed under moisture so as to do well.

Dr. S. G. Perry. I would like to relate a case with a view of obtaining light. It is a case where there were large fillings in the approximal surfaces of the right superior molars, and medium-sized ones in the approximal surfaces of the bicuspids. The teeth all responded quickly to ice, and yet, after two of the fillings in the approximal surfaces of the molars were removed and refilled, soreness commenced, with a little swelling, then an abscess, and finally a fistulous opening was established upon the gum. That indicated certainly a dead pulp in one or both of those teeth, and yet both teeth responded to ice.

I did not feel justified in opening into the teeth at once, and begged for time, hoping that something more favorable would be developed. That was last July; and when I saw the patient, three or four weeks ago, the fistulous opening had healed entirely, and the teeth all responded to ice on the buccal and lingual side perfectly.

How there could be a fistulous opening of this kind, accompanied with all the indications of a dead pulp, and yet the teeth respond to ice as they did, I cannot conceive. Any one would have supposed, after the manifestation of all these symptoms, that this was a case of periostitis, and yet there was not that redness of the gums which usually attends periostitis. There was, however, soreness located over the ends of the roots of the teeth, all pointing to inflammation, and maybe death of the pulp.

Dr. A. H. Brockway. It seems to me that this is a case analogous to one which I related a few months ago, where I diagnosed a dead pulp, and treated the case upon that diagnosis. This proved to be wrong. The pulp was living, and I then concluded that the trouble proceeded from necrosis in the socket, produced by over-malleting. That is the only case in which I ever knew it to occur.

Dr. Claude Rogers then read the following paper, entitled "Lining of Plates with Gutta-percha:"

Mr. President and Gentlemen :—Gutta-percha has been advocated and tried as a base or lining to metal plates, but for various reasons it has never become popular among dentists. Prominent among the reasons for this failure is the fact that the gutta-percha sold at the depots is largely adulterated with oxide of zinc, which being acted upon by the secretions of the mouth leaves the gutta-percha porous, and therefore liable to become a receptacle for putrid matter. There is a material, however, of a very pure character, not much known on this side of the Atlantic, manufactured in England under Mr. Edwin Truman's patents, which answers better than any other that has been tried. This is perfectly pure gum, with the addition of a small quantity of coloring matter. As Mr. Truman's method of using this material is not very generally known, I propose to note briefly some of his ways of using it, and its advantages over other materials now in use.

In the use of the ordinary materials for making artificial dentures, the piece to be made is worked on a model, the best that can be obtained. But when gutta-percha is used, the mouth itself is taken as the model on which to finish the work. Let us describe the mode of making the pieces. The earlier form was to make a metal core or frame, to which the teeth were attached, and the whole was covered with gutta-percha on both sides, leaving only the crowns of the teeth exposed. It was found that the lingual surface of the gutta-percha became abraded by contact with rough particles of food ; and here I will give my dissent to a plan once advocated of making the base entirely of gutta-percha, or with this frame or core. No doubt the many failures resulting from these early methods have been the cause of its falling into disuse. The plan now adopted is to make a plate of gold in the ordinary way, but with this difference, that wherever it is deemed necessary to line the plate with gutta-percha, at those parts chambers or boxes are made for its reception (these parts being the margins of the gums, necks of teeth, and any other protuberances it may be desirable to make). It is by no means proposed to line the whole surface of an upper plate all through. The model I pass round shows a case where three incisors have been lost, also two or three bicuspids. Here, it will be seen, means have been taken to form a chamber in the plate over the alveolar margin, corresponding to the three absent incisors, by covering that part with a layer of wax (of course, this is done before the swages are made). For the side teeth the crowns have been built up nearly to the full size, as something must be allowed for the thickness of the plate, by waxing on teeth cut off from old and waste models (as it is intended that the gold plate shall be struck up over the lingual and grinding surfaces of these teeth), thus in the finished piece leaving a hollow chamber or box for the gutta-percha. When such teeth are being built up, of course it is necessary to place them very accurately as to bite and articulation, using a single thickness of stout brown paper between the antagonizing teeth and those being constructed, to allow for extra thickness of plate.

Swages are then made from this modified model, on which the plate is struck up in the usual way. This stage having been finished, the next thing is to provide some means by which the gutta-percha shall be held firmly in the spaces left for its reception. Clean the model of all wax that was stuck on it previous to casting the swages, and to the plate, corresponding to the space over the alveoli of the incisors, solder at close intervals a strip of platinum-gauze; while for the same purpose in the bicuspid teeth strips of plate, with large holes drilled in them, have to be fixed transversely to that part which forms the crowns of the teeth, care being taken to keep such strips clear of the gum. The plate must then be cut away, at points where teeth are to be attached, so as to allow the artificial teeth to butt up against its edge instead of fitting on to it, as is usual. For the sides, instead of bicuspid teeth use flat eye-teeth (it will be remembered that the grinding and lingual surfaces have been formed in metal). In many cases where the adjoining teeth are somewhat loose it will be found advisable to form a box all around the lingual surface of the necks of the teeth, so that the remaining natural teeth shall be relieved from undue pressure of the metal plate.

Lower pieces are made in exactly the same way, the gutta-percha being used either simply over alveolar sockets where the teeth are missing, or else, as is generally more comfortable to the patient, the whole of the under surface of the plate may be lined with it. When the faces of the teeth do not show, as in the molars, the whole form of the crown may be made in metal, leaving on the under side a box to receive the gutta-percha.

A very nice way of making these lower pieces is to lay a strip of wax of a uniform thickness (about $\frac{1}{32}$ inch) all over the gum (*i.e.* wherever you wish the plate to go); from this make swages, and strike up the plate, finish off rough edges, etc., and line throughout with platinum-gauze; fix on the teeth with rubber in the ordinary way. For entire lower sets this plan is extremely nice. You have all the appearance of a smooth rubber plate combined with the weight of a gold one and the advantages of the gutta-percha, of which we will speak directly. The piece having been finished in the laboratory, the next point is to put on the gutta-percha, the requisites for which process being a spirit or gas flame with a pan of water over it, in which to soften the gutta-percha, and a rack so placed as to be able to heat two or three knives in the flame, for the purpose of trimming off the superfluous material. Take an estimated quantity of the gutta-percha, boil in the pan, and knead it with the fingers until you get rid of all streakiness and have a uniform fine material. Spread it out in a thick layer over the chambers destined to receive it, and having soaped the model, while it is still soft press it into its place (plate and all) a little; cut away superfluous gutta-percha with a hot knife, resoften, repress on to the model, and again trim, and so on until it is pressed nearly into place. Now lay the model aside and proceed in the same manner, only using the mouth itself as the model. The piece should be chilled, of course, in cold water previous to placing it in the mouth.

Now let us look at some of the advantages of this kind of work. And first it will be seen that the mouth itself is the model on which the gutta-percha is finally moulded, thus insuring against so many of the imperfections so common in the ordinary manner of making artificial dentures, viz., where the teeth overhang or converge, and it is impossible to get a perfect impression; in cases of recent extraction, or when loose teeth existing would soon require the piece to be remade or patched. All that is necessary is to remove the old gutta-percha and reapply, adding any new teeth that may be required. The piece is then in every respect equal to a new one. Again, a plate lined after this manner can be fitted over stumps with less fear of producing irritation of such than by the ordinary methods, as the gutta-percha adapts itself as well over a rugged as over a smooth surface, and without producing undue pressure. Lastly, it is the simplest form of plate to use when it is intended to make the piece and extract the teeth afterwards, a mode of practice so frequently asked by patients about to lose their front teeth. There is much less fear of soreness from abrasion of the mucous membrane, due to rubbing by a hard substance, such as vulcanite or gold.

I have to thank you, gentlemen, for listening to this very imperfect description of a plan of making artificial dentures. If I have been at all lucid in the matter, you will readily see that in many ways gutta-percha, as a permanent lining to plates, has many advantages which you do not get with other materials.

Dr. E. A. Bogue. I fancy that the gutta-percha of which Dr. Rogers speaks in his paper is very little known here. It is very tough. Of course, I do not know what its durability may be, but I have compared it with gutta-percha purchased at the shops here, and have found it to possess evidences of much greater durability. Naturally, our prejudices would be against the use of gutta-percha for any permanent work after remembering the experience of Dr. Slayton many years ago; but a case or two which I have seen in operation, which have been inserted in my own office, predispose me quite favorably toward this plan in some cases. Those who have followed Dr. Rogers in the reading of his paper will notice that in a case, for instance, where bicuspids on either side may have been lost, a plate can be struck, a gold plate, fitting the roof of the mouth and posterior part of the palate, and rising into the shape of bicuspids at the point of loss. This gutta-percha adapts itself to the gum by being pressed up there hot. In a case I have in mind the patient has repeatedly expressed her great delight with the comfort she now experiences from a plate of this kind. She is now wearing a plate with a continuous-gum block in front and gutta-percha at the sides.

Dr. N. W. Kingsley. There is one statement in the paper to which I must take exception. It was said that in cases where the teeth were hanging over or converging it was impossible to get a correct impression. *It is not even difficult to do so*,—to get a nearly absolutely accurate impression. The process is so simple, and has been so often described, that it seems almost needless to repeat it. No matter how irregular the position of the teeth—converging, or diverging, or hanging over, or even if they are so loose as to be ready to tumble out—there is no difficulty. I would use my material just as the mason would use plaster,—lay the plaster carefully over the parts with a spatula, then, after sufficient time has elapsed, with my knife split the plaster, take the pieces out, and reunite them, and make my cast.

(To be continued.)

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

At the regular monthly meeting of the above association, the president, Dr. Robert Huey, appointed the following committees to serve for the ensuing year:

Chemistry.—T. L. Buckingham, W. H. Trueman, Charles J. Essig. (Report in February and September.)

Pathology and Therapeutics.—G. T. Barker, T. L. Buckingham, M. Keim. (Report in October.)

Microscope and Dental Histology.—W. H. Trueman, C. N. Peirce, Robert Huey. (Report in March and November.)

Operative Dentistry.—E. T. Darby, E. R. Pettit, E. H. Neall, A. Wert, S. H. Guilford. (Report in April and December.)

Mechanical Dentistry.—C. J. Essig, J. H. Githens, Spencer Roberts, G. W. Adams, T. F. Chupein. (Report in January and May.)

Executive Committee.—E. R. Pettit, W. H. Trueman, E. H. Neall.

Separation of the Teeth.

Dr. E. H. Neall advocated separating some teeth, but did not think the system, as advanced by Dr. Arthur, could be carried out in all cases. With teeth that were broad at the necks and grinding surfaces, offering quite a large proximate contact, he thought the system had its advantages, and if the operation were faithfully performed would result in benefit to the patient; but in the cases of superficial decay of the incisors, bicuspids, and molars, whose necks were narrow, he could not see how the permanent separation plan could be used without such an amount of cutting as to mutilate the tooth, causing thereby much pain from the sensitiveness of the dentine thus deprived of its enamel, and annoyance from the impacting of food between the teeth thus separated. In these cases he separates by pressure and fills with gold, allowing the teeth to return to their natural places after the operation of filling is accomplished.

Dr. W. H. Trueman said that his opinions on this subject had been so often expressed, as well as laid before the profession in print, that he thought it useless to burden the report with a repetition of his views.

Dr. Buckingham did not think he could throw any light on this oft repeated and exhaustively discussed subject. When teeth *were decayed* he believed in Dr. Arthur's system of separating them; but he could not follow that gentleman in his position of *anticipating decay*. He believed that sound teeth should be let alone and only decayed ones treated. He did not even give full scope to the permanent separation plan advanced by Dr. Arthur in all classes of teeth, for if the anatomy of these organs was studied, it would be seen that all or nearly all of them were very much narrower at their necks, so that quite a large instrument could be passed through at the *free margin of the gum*, while at the grinding surfaces and cutting edges they pressed so closely together that it was often difficult to pass the thinnest floss between them. He believed Dr. Arthur's plan was to let the teeth touch only by a small point and by a thin plate of enamel on their buccal aspects, while considerable tissue was removed from their lingual and palatal proximate surfaces. If these cut surfaces were made sufficiently large they might be rendered self-cleansing, and thus preserve the teeth, but often the cutting was so considerable to secure this self-cleansing space as to leave the dentine in a highly sensitive condition, causing great pain to the patient while masticating the food, and in other cases, where the cuttings were not sufficiently large, it resulted in the impacting of food, giving great annoyance while eating. The question with him was, "Are we justifiable in anticipating decay?" He knew that "vaccination" was anticipatory, but can this same rule hold in the "hygiene" of the teeth? It looked to him like doctoring a child in good health. He therefore believed in leaving well alone, as it was impossible by any plan of treatment to improve the *form* or increase the utility of the teeth. Interference, then, except when actually demanded, should be discountenanced. When actually diseased, *then* he thought these separations might be made, but never in anticipation of decay.

Dr. E. R. Pettit drew several diagrams upon the blackboard, illustrating some of the difficulties met with in actual practice in endeavoring to carry out the method of separating teeth advanced by Dr. Arthur. He said he has no hesitation in separating the teeth by this method whenever decay is found to be present, and usually prefers wide separations. He also believes Dr. Arthur's system to be an admirable one for the prevention of caries in certain classes of teeth, where there is a strong predisposition to decay upon the proximate surfaces, and he should adopt it fully if his patients were so entirely under his control as to obey his instructions in regard to cleanliness, and if he could see them frequently so as to keep the surfaces thoroughly polished; but, with the carelessness and want of attention of parents to the teeth of their children, he did not feel justified in fully adopting this method for the *prevention* of decay. When he finds teeth decayed on the proximate surfaces of one side, he believes it best to separate the corresponding teeth of the opposite side, and if he finds decay, however slight, upon the proximate surfaces of the central incisors, he believes it best to separate all the front teeth. This treatment is of course modified according to circumstances, or peculiarities in the arrangement of the teeth.*

Dr. S. H. Guilford said the subject was too broad to be embraced in a discussion like the present one. So many various cases presented which called for different plans of action, that no one rule or system *could* comprise them. He thought Dr. Arthur went too far when he advanced his system as being able to comprise all classes of teeth. In teeth with broad proximate surfaces he used Dr. Arthur's plan for *deep-seated.* as well as *incipient* decay; but in teeth with narrow necks makes use of the contour plan. If permanent separations are made at all. he thought they should be made large, so as to secure self-cleansing spaces. He thought well of contour fillings in some cases; but believed that, as a rule, those who advocated this system to the exclusion of the other erred in the amount of tissue they cut away in order to bring their cavities to the masticating surface, thus greatly weakening the teeth.

Dr. Guilford spoke of special cases and illustrated his remarks with blackboard delineations. He spoke of a manner he used of detecting incipient decay by passing *un*waxed floss between the teeth, when if there was any roughness present the floss would be cut or frayed. Also, in connection with it, used, after getting the surfaces dry, Perry's exploring instruments assisted by a magnifying glass and reflected light from a mouth mirror beneath.

Dr. Chupein being requested by the president to offer some remarks on the subject, said that his views had been so thoroughly discussed in the friendly "tilt" between Dr. M. H. Webb and himself, published in the DENTAL COSMOS, that he did not think he could add anything more. He would say, however, that he thought the treatment more successful in those teeth which offered broad proximate surfaces of contact; that those teeth which had narrow necks it had been his experience to find not liable to decay, and they therefore did not require to be operated on at all. When he did separate teeth by Dr. Arthur's system he made large double V-shaped spaces, and had been successful in preserving the teeth he operated on by this plan as well as in preventing the impacting of food, and in securing permanent self-cleansing spaces. Pain was present, and often continued for a long time after the teeth were thus cut, but it generally passed off after a time, and could be made to do so sooner than it would do of its own accord by frequent polishing on the part of the patient with a little whiting on a strip of linen or cotton cloth, or with the soft rubber disks driven by the dental engine with any of the polishing materials in general use by dentists.

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* Full justice cannot be given in this report to the remarks of Drs. Pettit, Guilford, and Bonwill, as they illustrated them by diagrams on the blackboard.—REPORTER.

Dr. A. Wert said he might be considered presumptive in opposing so eminent a man as Dr. Arthur, but his opinions were opposed to his teachings so far at least as relates to the destruction of sound tooth-structure. We all knew how the space was lessened when a tooth was extracted, which showed the great disposition of all teeth to lean against or approach each other, and therefore could not see how they could be permanently separated. He had seen teeth turn so as to meet again on parallel lines with others in the mouth. He does not believe in anticipating decay, but he thought when teeth were badly decayed they should be well separated; in fact, he believed in separations in most decayed teeth.

Dr. M. Keim being requested to speak on the subject, said that his ideas were so entirely expressed by the gentlemen who had spoken on the subject that he had nothing to offer in addition. He believed in treating cases by one plan or by another, as it offered the chances which experience proved would be most successful.

Dr. W. G. A. Bonwill. The president requesting Dr. B. to give his views on this subject, he did so, illustrating them with blackboard delineations. He said he believed in permanent separations, and had always practiced by that plan; that an experience of twenty-two years had rather confirmed than lessened his opinion of its utility as a means of preventing decay of the teeth; that he anticipated decay, because he had observed that if certain teeth were decayed on their proximate surfaces, certain other teeth were sure to follow sooner or later, and the adage of "an ounce of prevention being worth a pound of cure," came in most aptly. He had had his failures —as who had not?—but he was not ashamed of them, because he was conscientious in what he did. Some teeth he let alone, as he knew they would not decay; he only anticipated decay in those cases which observation and experience proved to his mind *would* decay sooner or later. He did this to save his patient an unnecessary outlay, as the removing of superficial decay only cost his patient one dollar, while if the tooth was left to decay so deep as to require a filling it would cost three, four, or five dollars, and probably more. Besides, he held that the removal of superficial caries was a better operation than the insertion of the most perfect filling. He said he attributed his failures to cases where he did not operate early enough. Dr. B. spoke of his diamond reamer, with which he operated on the front teeth on their *palatal aspect*, by which incipient decay was entirely removed, leaving the surface operated on most beautifully polished, not in the slightest disfiguring the teeth, and giving an abundance of space to operate, where caries in these teeth and on these surfaces was deep-seated. He said the operation was attended only by noise—but not with pain, so that some of his patients had facetiously remarked of him in connection with his electric mallet that he worked both by "thunder and lightning." He delineated his manner of using the disk so as to leave but a minute point of contact, cutting the molars and bicuspids both on their buccal and palatal aspects. He used a small disk and cut one-eighth of an inch below the gum, and instead of cutting the teeth in the form of a wedge he rounded the apex of the wedge-shape cut, so as to prevent capillary attraction, which that form of cut induced, and which he thought favored a recurrence of decay. He did not claim anything new in what he did; he did not think Dr. Arthur claimed originality in his system.

Dr. Buckingham said he must enter his protest against anticipating decay. Referring to Dr. Bonwill's statements of making these separations by cutting with the disk one-eighth of an inch below the margin of the gum, he said the operation became exceedingly painful, and his patients would not stand it. He had had his own teeth separated, and he knew how long they had remained sensitive.

Dr. Bonwill said if he ran his engine at the slow speed (fourteen hundred revolutions or thereabouts per minute) that Dr. Buckingham did, he felt sure he would inflict considerable pain, but in making these separations he forced a velocity of four thousand revolutions per minute, or more, and by this velocity overcame the pain, as it was a fact beyond dispute that a wound inflicted *with velocity* was *painless*, while one inflicted *slowly* was *painful*.

The subject was then passed, and the meeting adjourned.

AMERICAN MICROSCOPICAL SOCIETY OF THE CITY OF NEW YORK.

At the annual meeting of the American Microscopical Society of the city of New York, held Tuesday evening, January 9th, 1877, the following officers were elected for the ensuing year:

President.—John B. Rich,* M.D., 35 East Tenth Street, New York.

Vice-President.—William H. Atkinson,* M.D., 41 East Ninth Street, New York.

Secretary.—O. G. Mason, Bellevue Hospital, New York.

Treasurer.—T. D'Orémieulx,* 7 Winthrop Place, New York.

Curator.—John Frey, Bellevue Hospital, New York.

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* Re-elected.

BIBLIOGRAPHICAL.

On Coughs, Consumption, and Diet in Disease. By Horace Dobell, M.D., F.R.M.C.S., Consulting Physician to the Royal Hospital for Diseases of the Chest, London, etc. Philadelphia, D. G. Brinton, 115 South Seventh Street, 1877.

Dr. Dobell is widely and favorably known as an able writer and clinical lecturer on thoracic diseases. The volume before us is made up of a series of extracts from various published lectures, so arranged as to form a connected treatise on the diagnosis and treatment of some of the most common diseases of the respiratory organs. A portion of the volume is devoted to the *principles* of diet in disease. This section is worthy of study, because it deals with the theory of alimentation in disease, on scientific grounds.

The book is a valuable compend of the topics treated.

VULCANITE LITIGATION.

THE FINAL DECISION.

On the 8th of January last, the Supreme Court of the United States announced its decision on the appeal of Daniel H. Smith (against the Goodyear Dental Vulcanite Company and Josiah Bacon) from the decision of Judge Shepley, in this well-known test case.

We were unable to procure copies of the opinions in time for the February issue, but now give them in full. As will be seen, the majority of the Court hold that "the conclusion of the whole matter is that the patent is a valid one, and therefore that the decree of the Circuit Court should be affirmed."

This decision establishes the claim of the patentees to the dental vulcanite plate, after a discussion by the Court of the several defenses submitted. We do not undertake to offer any comments upon the reasoning through which the conclusion is reached. This case has been faithfully presented, patiently heard, deliberately considered, and is now conclusively decided.

With the opinions of the Court in full before them, those interested can carefully examine, each for himself, the issues made, the facts established, and the grounds upon which those facts are disposed of.

SAMUEL S. WHITE.

SUPREME COURT OF THE UNITED STATES.

No. 113.—October Term, 1876.

Daniel H. Smith, Appellant, *vs.* The Goodyear Dental Vulcanite Company and Josiah Bacon.	Appeal from the Circuit Court of the United States for the District of Massachusetts.

Mr. Justice Strong delivered the opinion of the Court.

A brief review of the history and nature of the patent which the complainants allege has been infringed will aid materially in solving the questions presented by this appeal. On the 14th day of May, 1852, Dr. John A. Cummings, a dentist of Boston, filed in the Patent Office a caveat to protect an invention he claimed to have made, of certain new and useful improvements in the setting and plates of artificial sets of teeth. The description accompanying the caveat indicated with very considerable clearness what the alleged invention was, and the objects sought to be gained by it. The improvement was declared to "consist in forming the plate, and also the gums in which the teeth are inserted, of rubber or some other elastic substance, so compounded with sulphur, lead, and other similar substances as to form a hard gum, or whalebone gum, rigid enough for the purposes of mastication, and pliable enough to yield a little to the mouth." "By this improvement," the caveator said, "the teeth can be easily baked into the gums which form one piece with the plate." Subsequently, on the 12th of April, 1855, he applied for a patent, reciting in his application that he had previously entered a caveat. His accompanying specification declared the invention to consist in "forming the plate and gums to which the teeth are attached, of rubber or some other elastic material, so indurated as to be rigid enough for the purpose of mastication, and pliable enough to yield a little to the motions of the mouth, and in one piece, the teeth being imbedded in the elastic material while the material is in a soft condition, and then baked with the gums and plate, so that the teeth, gums, and plate will all be connected, forming, as it were, one piece." This application for a patent was rejected on the 19th of May next following, and the applicant was referred to two printed publications, one suggesting the use of gutta-percha as a base for artificial sets of teeth, and the other suggesting pastes, analogous to porcelain paste, as well as gutta-percha. Cummings then amended his specification by striking out all reference to gutta-percha or other merely elastic material, disclaiming the use of gutta-percha, and any material which is merely rendered plastic by heat and hardened by cooling, and he claimed the improvement in sets of mineral, or other artificial sets of teeth, which consists in combining the teeth with a rubber plate and gums, which, after the insertion of the teeth, are vulcanized by Goodyear's process, or any other process, forming thereby a cheap, durable, and elastic substitute for the gold plates theretofore used. This amendment, however, proved ineffectual. The application for a patent was again rejected, and a third rejection followed a reconsideration for which the applicant had asked. This third rejection was on the 3d day of February, 1856. From that time onward for several years, indeed until the patent was finally granted, the evidence very satisfactorily shows that Dr. Cummings was in a condition of extreme poverty, utterly unable to bear the necessary expenses of prosecuting his case further. But he did not withdraw his application. He did not ask for a return of part of the fee he had paid, nor by any act of his did he indicate acquiescence in the unfavorable action of the Patent Office. On the contrary, he continued to assert his expectation of ultimately obtaining a patent, formed plans for his own action after it should be obtained, and complained of what he supposed to be the negligence of his solicitor. The proof of his extreme poverty is ample. His ill-health interfered with his working successfully in the line of his profession, and his family was subjected to great privations. He seems never to have had any considerable money. He borrowed sometimes small sums to purchase underclothing for himself. He made frequent applications to his friends for advances to enable him to prosecute his application for a patent, offering as a compensation for such advances sometimes one-quarter and sometimes one-half of the patent when obtained. He appears never to have remitted his efforts until, in 1864, he induced Dr. Flagg, who had been his partner in former years, and Dr. Osgood to advance, first, one hundred dollars, and afterwards, seven hundred and twenty dollars, by means of which the patent was obtained. Even then he had not the twenty dollars necessary to be paid when it was allowed. For the assistance he thus received he gave one-quarter of his invention. Before this time, between the third rejection of his application and his obtaining the advances mentioned, everything was done which was within his power. In February, 1859, in the midst of his pecuniary embarrassments, his solicitor applied to the Patent Office, not for a return of any portion of the fee paid, nor for a withdrawal of the application, but that the specification and one drawing might be sent to him. This request was refused. An attempt was then made for an appeal to the board, but that not being allowed by the commissioner, nothing further was done in the Patent Office until the applicant was enabled by the funds obtained from Drs. Flagg and Osgood to renew his endeavors. Then, on the 1st of March, 1864, he presented a petition for the grant of a patent to himself for the same invention which he had endeavored to secure in 1855 (the application for which remained in the office unwithdrawn), and accompanied his petition with a specification and drawings corresponding exactly with those he had previously made. This final effort was successful. The office practically acknowledged that the prior rejection had been an error, and declared that, in justice to his rights as an inventor, the admission of his claim, limited to the use of hard rubber or vulcanite, as he had before limited it, would not be objected to. Accordingly, the patent was granted on the 7th of June, 1864, and by sundry conveyances it subsequently became vested in the complainants. Two surrenders and reissues have since been made, the last dated March 21, 1865, and it is for an alleged infringement of this second reissue that the present suit has been brought. The bearing of this history upon the merits of the controversy will appear as we proceed to examine the several defenses set up.

Among these the one perhaps most earnestly urged is the averment that the device described in the specification was not a patentable invention, but that it was a mere substitution of vulcanite for other materials which had previously been employed as a base for artificial sets of teeth, a change of one material for another in the formation of a product. If this is in truth all that the thing described and patented was; if the device was merely the employment of hard rubber for the same use, in substantially the same manner and with the same effect that other substances had been used for in the manufacture of the same articles, it may be conceded that it constituted no invention. So much is decided in Hotchkiss *vs.* Greenwood, 11 How., 248. But such is not our understanding of the device described and claimed. In the specification it is declared that the invention "consists in forming the plate to which the teeth, or teeth and gums, are attached, of hard rubber, or vulcanite, so called, an elastic material possessing and retaining in use sufficient rigidity for the purpose of mastication, and at the same time being pliable enough to yield a little to the motions of the mouth." This is immediately followed by a description of the manner of the proposed use; that is, of making the hard-rubber plates, and the claim, as stated, is "the plate of hard rubber, or vulcanite, or its equivalent, for holding artificial teeth, or teeth and gums, substantially as described," that is, plainly, formed as described. The invention, then, is a product of manufacture made in a defined manner. It is not a product alone separated from the process by which it is created. The claim refers in terms to the antecedent description, without which it cannot be understood. The process detailed is thereby made as much a part of the invention as are the materials of which the product is composed. We shall not quote at large the description of the mode of making the plate. Such a quotation would unnecessarily prolong this opinion. It plainly shows a purpose of the inventor to secure what had not been secured before—a combination of a plate with artificial teeth, or with gums and teeth, in such a manner as to be free from the objections and defects or inconveniences attending the method before practiced of attaching such teeth to a metallic plate fitted to the roof of the mouth. Some of these objections are stated—such as expense, hurting the mouth, impeding mastication, and obstruction to perfect articulation. In carrying out the purpose proposed the materials employed were all old. The teeth, the wax, the plaster, the moulds, the soft rubber, and the hard rubber were none of them new. It is also true that the steps in the process were not all new. Plaster had been used for formation of moulds. The process of forming a plate by the use of such moulds was well known, and so was the process of converting a vulcanizable compound into vulcanite by heating it and allowing it to cool in moulds. But the process of Dr. Cummings extended beyond the use of known materials and the employment of the processes mentioned. It was vulcanizing soft rubber in a mould and in contact with artificial teeth inserted in place into it while it remained in a soft condition. It is well described by the circuit judge as "the making of a vulcanite dental plate out of a vulcanizable compound into which the teeth were imbedded in its plastic condition, and the rubber compound, with the teeth thus imbedded in it, afterwards vulcanized by heat, so that the teeth, gums, and plate should be perfectly joined without any intervening crevices, and the plate should possess the quality of hard rubber or vulcanite." The combination thus resulted in a manufacture which was "one piece." If, then, the claim be read, as it should be, in connection with the preceding part of the specification, and construed in the light of the explanation which that gives, the invention claimed and patented is "a set of artificial teeth as a new article of manufacture, consisting of a plate of hard rubber, with teeth, or teeth and gums, secured thereto in the manner described in the specification, by imbedding the teeth and pins in a vulcanizable compound, so that it shall surround them while it is in a soft state, before it is vulcanized, and so that when it has been vulcanized the teeth are firmly and inseparably secured in the vulcanite, and a tight joint is effected between them, the whole constituting but one piece." It is evident this is much more than employing hard rubber to perform the functions that had been performed by other materials, such as gold, silver, tin, platinum, or gutta-percha. A new product was the result, differing from all that had preceded it, not merely in degree of usefulness and excellence, but differing in kind, having new uses and properties. It was capable of being perfectly fitted to the roof and alveolar processes of the mouth. It was easy for the wearer and favorable for perfect articulation. It was light and elastic, yet sufficiently strong and firm for the purposes of mastication. The teeth, gums, and plate constituting one piece only, there were no crevices between the teeth and their supports into which food could gather, and where it could become offensive, and there could be no such crevices so long as the articles lasted. They were unaffected by any chemical action of the fluids of the mouth. Besides all this, they were very inexpensive as compared with other arrangements of artificial teeth. To us it seems not too much to say that all these peculiarities are sufficient to warrant the conclusion that the device was different in kind or species from all other devices. We cannot resist the conviction that devising and forming such a manufacture by such a process and of such materials was invention. More was needed for it than simply mechanical judgment and good taste. Were it not so, hard rubber would doubtless have been used in the construction of artificial sets of teeth, gums, and plates long before Cummings applied for his patent. To find a material, with a mode of using it, capable of being combined with the teeth, in such a manner as to be free from the admitted faults of all other known combinations, had been an object long and earnestly sought. It had been a subject for frequent discussion among dentists and in scientific journals. The properties of vulcanite were well known, but how to make use of them for artificial sets of teeth remained undiscovered and apparently undiscoverable until Cummings revealed the mode. But when revealed its value was soon recognized, and no one seems to have doubted that the resulting manufacture was a new and most valuable invention. The eminent dentists and experts examined in this case uniformly speak of it as such. Not one has ventured to testify that it was not an invention. They speak of it as "a novel and desirable thing;" as "the greatest improvement in dentistry" made in many years, and as an invention which is "a great benefaction to mankind, whereby both health and comfort are promoted." The evidence also shows that it has wrought a revolution in dental practice, and that many thousands of operators are using it in preference to older devices. All this is sufficient, we think, to justify the inference that what Cummings accomplished was more than a substitution of one material for another—more than the exercise of mechanical judgment and taste—that it was, in truth, invention. Undoubtedly the results or consequences of a process or manufacture may, in some cases, be regarded as of importance when the inquiry is whether the process or manufacture exhibits invention, thought, and ingenuity. Webster, on the subject-matter of patents, page 30, says, "The utility of the change, as ascertained by its consequences, is the real practical test of the sufficiency of an invention, and since the one cannot exist without the other, the existence of the one may be presumed on proof of the existence of the other. Where the utility is proved to exist in any degree, a sufficiency of invention to support the patent must be presumed." We do not say the single fact that a device has gone into general use, and has displaced other devices which had previously been employed for analogous uses, establishes in all cases that the later device involves a patentable invention. It may, however, always be considered, and when the other facts in the case leave the question in doubt, it is sufficient to turn the scale.

We have, therefore, considered this branch of the case without particular reference to Hotchkiss *vs.* Greenwood, 11 How., 248. The patent in that case was for an improvement in making door and other knobs for doors, locks, and furniture, and the improvement consisted in making them of clay or porcelain, in the same manner in which knobs of iron, brass, wood, or glass had been previously made. Neither the clay knob nor the described method of attaching it to the shank was novel. The improvement, therefore, was nothing more than the substitution of one material for another in constructing an article. The clay or porcelain door-knob had no properties or functions which other door-knobs made of different materials had not. It was cheaper and perhaps more durable, but it could be applied to no new use, and it remedied no defects which existed in other knobs. Hence it was ruled that the alleged improvement was not a patentable invention. The case does decide that employing one known material in place of another is not invention, if the result be only greater cheapness and durability of the product. But this is all. It does not decide that no use of one material in lieu of another in the formation of a manufacture can, in any case, amount to invention or be the subject of a patent. If such a substitution involves a new mode of construction, or develops new uses and properties of the article formed, it may amount to invention. The substitution may be something more than formal. It may require contrivance, in which case the mode of making it would be patentable, or the result may be the production of an analogous but substantially different manufacture. This was intimated very clearly in the case of Hicks *vs.* Kelsey, 18 Wall., 670, where it was said "the use of one material instead of another in constructing a known machine is, *in most cases*, so obviously a matter of mere mechanical judgment, and not of invention, that it cannot be called an invention, *unless* some new and useful result, as increase of efficiency, or a decided saving in the operation be obtained." But where there is some such new and useful result, where a machine has acquired new functions and useful properties, it may be patentable as an invention, though the only change made in the machine has been supplanting one of its materials by another. This is true of all combinations, whether they be of materials or processes. In Crane *vs.* Price, 1 Webster's Patent Cases, 393, where the whole invention consisted in the substitution of anthracite for bituminous coal in combination with a hot-air blast for smelting iron ore, a patent for it was sustained. The doctrine asserted was that if the result of the substitution was a new, a better, or a cheaper article, the introduction of the substituted material into an old process was patentable as an invention. This case has been doubted, but it has not been overruled, and the doubts have arisen from the uncertainty whether any new result was obtained by the use of anthracite. In Kneass *vs.* The Schuylkill Bank, the use of steel plates instead of copper for engraving was held patentable. So has been the flame of gas instead of the flame of oil to finish cloth. These cases rest on the fact that a superior product has been the result of the substitution, a product that has new capabilities and that performs new functions. So in the present case the use, in the manner described, of hard rubber in lieu of the materials previously used for a plate, produced a manufacture long sought but never before obtained—a set of artificial teeth, light and elastic, easily adapted to the contour of the mouth, flexible, yet firm and strong, consisting of one piece, with no crevices between the teeth and the plate, impervious to the fluids of the mouth, unaffected by the chemical action to which artificial teeth and plates are subjected when in place, clean and healthy,—peculiarities which distinguish it from everything that had preceded it. These differences, in our opinion, are too many and too great to be ascribed to mere mechanical skill. They may justly be regarded as the results of inventive effort, and as making the manufacture of which they are attributes a novel thing in kind, and consequently patentable as such.

A second objection urged by the defendant against the validity of the complainant's patent is alleged want of novelty of the invention, and a strenuous effort has been made to convince us that, although hard rubber had not been used in the manner described for the production of the manufacture, equivalent materials and processes had been, and that a plate substantially the same as that of Dr. Cummings had been made before his improvement. We are not, however, convinced. The patent itself is prima facie evidence that the patentee was the first inventor, at least it casts upon him who denies it the burden of sustaining his denial by proof. We do not find such proof in the case. Though the patent was not granted until June 7th, 1864, the invention was completed at least as early as April 12th, 1855, when the application for a patent was made. Indeed, as we have noticed, a caveat to protect it was filed on the 14th of May, 1852, which clearly foreshadowed the invention. Yet taking the spring of 1855 as the time when it was completed, we find nothing in the proofs to justify a conclusion that Dr. Cummings was not the first inventor. It would answer no good purpose to review the voluminous evidence supposed to bear upon this branch of the case. We shall refer only to that which is deemed most important, and which has been most pressed upon us in this argument. Of the English patent of Charles Goodyear it is enough to say that, though the provisional specification was filed March 14th, 1855, the completed specification was not until the 11th of September following. It was, therefore, on the last-mentioned date that the invention was patented.

The experiments made by George E. Hawes, it must be admitted, closely resembled the process described in the reissued patent to the complainants. He cast in moulds sets of teeth on a tin base, in a manner very like that in which the vulcanite plate is formed by the Cummings process. But the experiments resulted in nothing practical. Hawes cast sets of teeth for the lower jaw only, the weight of the metal making the plate unfit for the upper. In consequence of the shrinkage of the metal in cooling, a tight joint could not be obtained between the teeth and the base. The sets were, therefore, liable to become offensive in consequence of deposits of food and the secretions of the mouth in the crevices. The shrinkage also prevented a close fitting of the plate to the roof of the mouth, and the tin base was affected by the chemical action of the secretions. In consequence of these and other objections the manufacture was soon abandoned, and it may properly be considered an abandoned experiment. It not only was not the same manufacture as that of Cummings, but it was not suggestive of it, and Dr. Hawes, who cast the tin plates, testifies that the use of vulcanite for dental purposes is the greatest improvement in his profession that he knew of in twenty-five years. He adds "that vulcanite may be used by dentists in many ways which could not be accomplished by tin or platinum." In his opinion, therefore, the cast tin base was not substantially the same thing as the Cummings manufacture. So, also, Dr. Royce, who cast plates of tin for artificial teeth in a manner very similar to that of Dr. Hawes, testifies that the solid tin base was found practically unfit for the purpose, except in rare instances. He made but a few sets, none after 1850, and adopted the vulcanite, agreeing to pay for a license to use it in manufacturing dental plates.

We need go no farther into a consideration of the various devices and publications offered to show that the manufacture patented was known before Cummings invented it. Suffice it to say, that none of them, in our opinion, suggest or exhibit in substance such a manufacture. The defense of want of novelty is, therefore, not sustained.

It is further insisted by the defendant that the reissued patent on which this suit is founded is not a patent for the same invention which was described in the specification of the original patent, and, therefore, that the reissue is unauthorized and void. To sustain this position the defendant must overcome the presumption against him arising from the decision of the Commissioner of Patents in granting the issue, and this he can do only by showing from a comparison of the original specification with that of the reissue that the former does not substantially describe what is described and claimed in the latter. This must plainly appear before we can be justified in pronouncing the reissued patent void. But this, in our judgment, does not appear. The first specification describes a set of artificial teeth having a hard-rubber plate made by a process substantially the same as that indicated in the later patent. The description of the process is not quite so minute, but it is sufficiently full to be understood and to enable an operator to make the manufacture. Certainly it is not another process, and as its result is the same, it is impossible to hold that the reissued patent is for a different invention from the one protected by the original patent. It is true the specification of the reissue describes also another process not described in the specification of the first, namely, a mode of making the moulds, but that is not claimed as a part of the invention.

The remaining defenses to the bill rest mainly on the assumption that the new petition presented to the Patent Office in 1864 cannot be regarded as a continuation of the application made for a patent on the 12th of April, 1855. But this cannot be conceded. The history of the application, as we have given it, forbids such an assumption. No act of Cummings amounted to a withdrawal of his first petition or to an acquiescence in its rejection. It is true he filed a second petition in 1864, but he accompanied it with substantially the specification that remained in the office and with the same drawings. It was a mode of procuring another consideration of his rejected claim, and the commissioner regarded it as such. The act of March 2d, 1861, gave him authority thus to regard it. He replied to the application that his claim was embraced in an application filed by him in 1855, and rejected for want of novelty, admitted that it had been improperly rejected, and suggested an amendment to make it correspond with his former amended claim. It is impossible, in view of these facts, to regard the effort to obtain a new patent in 1864 as a new and independent application, disconnected from the application made in 1855. It was but one stage in a continuous effort. In Godfrey *vs.* Eames, 1 Wall., 317, the first application was actually withdrawn and a new petition was presented at the time of the withdrawal, with a different description of the invention, but as the thing patented under the second might have been engrafted as an amendment of the first, it was ruled that all the proceedings constituted one application. This court said, "If a party choose to withdraw his application for a patent, and pay the forfeit, intending at the time of such withdrawal to file a new petition, and he accordingly does so, the two petitions are to be considered parts of the same transaction, and both as constituting one continuous application." We are not aware that filing a second petition for a patent, after the first has been rejected, has ever been regarded as severing the second application from the first and depriving the applicant of any advantage he would have enjoyed had the patent been granted without a renewal of the application. The contrary was decided by the Circuit Court for the Southern District of Ohio, in Bell *vs.* Daniels, 1 Fisher, 372, and in Blandy *vs.* Griffith et al., 3 Fisher, 609. And these decisions are founded in justice and sound reason.

If, then, as we think it must be held, the proceeding to obtain the patent was a continuous one from 1855 until it was granted; if the application of 1855 is not severable from the proceedings of 1864, there is no foundation whatever for the allegation that the invention was abandoned to the public, and that it was in public use or on sale for more than two years before the inventor's application. The first use of it proved, by any other than Dr. Cummings, was in 1859, and there is no evidence that this was with his consent. And the proof respecting his health and pecuniary condition, together with his constant efforts to obtain the necessary means to prosecute his right, rebuts all presumption that he ever abandoned, actually or constructively, either his invention or his application for a patent. That he never intended an abandonment of his invention is perfectly clear, and it was not his fault that granting the patent was so long delayed.

The conclusion of the whole matter is that the patent is a valid one, and, therefore, that the decree of the circuit court should be affirmed.

The decree of the circuit court is affirmed.

Mr. Justice Bradley dissenting.

I dissent from the judgment of the court in this case on the ground that the patentee having duly made his application for a patent in 1855, and the same having been three times rejected, must be considered as having abandoned the same, inasmuch as no further effort was made to obtain a patent until eight years afterwards, without any pretense that the patentee was engaged in perfecting his invention, and in the mean time the invention which he claims as his had come into general public use. The application for a patent made in 1864 was a new and independent application, and should be treated as such. As the public had enjoyed the use of the invention for more than two years prior to this application, the patent should be declared invalid. Great injustice will, in my judgment, be done to the public to allow a patent obtained under such circumstances to stand. The public had a right to suppose that no further application would be made. The levy of a tribute now on all the dentists of the country who have brought the plate into public notice and use seems to me a species of injustice. The delay of the patentee, in fact, is made to operate to his benefit instead of his prejudice; his patent being made to run eight years longer than it would have done had it been granted when first applied for. So that the public is still further injured by sustaining the patent as finally granted. It is too common a case that associated companies, in order to maintain some valuable monopoly, look about to see what abandoned invention or rejected application, or ineffective patent, can be picked up, revamped and carried through the Patent Office; and by the aid of ingenious experts and skillful counsel succeed in getting the desired protection. I think that the courts ought to be strict in maintaining the rights of the public in such cases. And the present case seems to me to be one in which we ought to hold the patent invalid as against those rights.

Mr. Justice Miller and Mr. Justice Field concur in this opinion.

D. W. MIDDLETON,
C. S. C. U. S.

PERISCOPE.

The Art of Medicine.—* * * In feeble and broken outline such is the art of medicine, and such are the relations which it maintains. And as year by year it grows in importance and increases in influence, our responsibilities become more numerous and solemn. Even in a moderate sense it is neither a short nor an easy duty to discharge the obligations herein imposed, and in the highest sense it is impossible,—our knowledge, and our power of using it being both, although unequally, inadequate. For medicine, with all its teachings and appliances, is still an imperfect art, in which the known suffers restriction from the unknown; and, for all the light which has been cast upon it, it is still burdened with errors and superstitions, still blind to the modes and measures of its ignorance, distracted by false aims and shackled by imperfect methods. But to these external difficulties, which time will take away, we must add others, which seem to be inherent and ineradicable. It is true that here, as elsewhere in nature, there is in like conditions an unalterable uniformity of action, and that in proportion to our knowledge of exclusive successions of actions is our power of controlling their direction, when it is capable of control, and our freedom from error. But the conditions in which nature acts under the phenomena of health and of disease admit of such infinite variations from such minute disturbances, that in the midst of a constantly moving equilibrium of multitudinous forces, essential to the life of every organism, the causal relations of things or states are with only the utmost difficulty caught and demonstrated. There is, too, in at least one region of nature, a sense in which this absolute and eternal uniformity of action must be denied. For although from the stand-point of logic it may be held that the *causal nexus* exists unbroken throughout the universe, from the stand-point of medicine it may also be held that it is certainly interrupted in man. Logic is neither the exclusive test nor the final measure of truth, and there are conditions in which strictly reasoned conclusions must suffer refutation from empirical observation. In the mystery of the human will,—in the play of thought which connects the visible with the unseen,—in the emotions which agitate the human breast,—there is an element of disturbance which, in the phenomena of disease, is almost always in action, and which, in the calculations of causality, can never be precisely estimated.

Again, in studying the history of pathological actions, we can sometimes observe that a certain malady, recurring from time to time in the same individual, in apparently the same conditions, assumes new characters and a different quality of action under the influence of differentia so subtle as to elude the narrowest scrutiny. Even our advancing civilization creates its difficulties, as the human organism perforce responds to its progressively changing environments. The nervous system cultivated in every direction, strained, excited, hurried by the baleful exigencies of modern life, assumes an almost fresh relation to the other parts of the body, recasts its solidarity, and not only alters the complexion of accustomed diseases, but engenders new and puzzling disorders. Hence it sometimes happens that the accumulations of experience become valuable only for their suggestive uses and their personal discipline. On fresh occasions, still far too frequent, our knowledge must be discovered, and our practice framed anew; and our desire to help, fettered by the fear that we may harm, falls short both of its object and its end.

Nor should we here overlook those difficulties of medicine which lie in the personality of its cultivators. Inaccurate and insufficient observation, ignorance of the collateral knowledge necessary to a just interpretation of fact, narrowness of view, the substitution of names for ideas, lack of accuracy and method in setting down results, the confusion of things accidental or accessory with things essential, the disturbing influences of desire, the bias of preformed opinion, hasty and erroneous generalizations,—these are all difficulties which seriously hinder or misdirect the progress of medicine; and they are difficulties from which no intellect, however trained and disciplined, is wholly free.

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As I have said a little while ago, medicine is advancing with rapid strides in every direction. The whole field of work has been enlarged; freer communications with bordering sciences have been established. New lines of inquiry have been opened; fresh interests have been created; unthought-of agencies have sprung into importance; unexpected problems are pressing for solution; and the hum of a busy and fruitful activity has been pervading all its ranks and filling the air around. The discoveries of the last twenty years surpass in number and importance those of the preceding century; and to-day we are so full of the promise of others that it would seem as if the immortal Descartes was not dreaming, but prophesying, when he said that if ever it became possible to perfect mankind, the means of doing so would be found in the medical sciences.

We need not go far afield to find the causes of this great and happy change. In the readier diffusion of knowledge through more numerous bodies of investigators, in truer aims and correcter methods, in the disregard of scientific creeds, and in greater readiness to revise our opinions and recant our errors,—in limiting the points and simplifying the conditions of particular inquiries, in more delicate instruments, in finer and exacter calculations, and, above all, in the greater number of more skillfully conceived and carefully executed experiments upon animals, we shall find the main secrets of the progress over which we now exult.

When we cast our eyes along the past, to mark the manner in which medicine has advanced in the later periods of its history, we observe that the scientific army has never moved with more than one leader at the van. In the beginning of the century it was chemistry which led the way and carried on the work; and when chemistry was exhausted, morbid anatomy took its place. To morbid anatomy succeeded histology; to histology, pathology; and now in the forefront we see experiment, young in command, but skillful in strategy and successful in conquest.

It is to experiment, in some shape or another, that we owe the bulk of our recent gains; and for at least a generation to come it is to experiment, assisted by chemistry and physiology, that we shall have to look for the most substantial additions to our knowledge of the nature and treatment of disease. The importance of experiment indeed cannot be overrated; for through it we shall often have to look for the criterion of uncertain doctrines, the solution of unsettled problems, the organization of fresh inquiries, the annexation of outlying truths, the discovery of unknown facts and laws.

But experiment has also its other side; and, disregarding its inherent difficulties, which are neither few nor slight, it is beset with dangers which must be watched with a jealous eye, and guarded against with a firm hand. By the prestige of precision, often unmerited, which they carry with them, experiments sometimes cover the most flagrant errors and give currency to false or inadequate generalizations.—*Introductory at the London Hospital, by Andrew Clark, M.D., F.R.C.P., in Medical Times and Gazette.*

Mercurial and Syphilitic Teeth (*Concluded from page* 106).—The Chairman.—I remember one case at the Children's Hospital which made an impression on my mind. There were two children, one brought up by the mother, and the other brought up by the artificial use of the bottle, with a teat in which sugar was put, because the child would not take to it without. The teeth were particularly good in both children, very much beyond the average; and the children were very healthy. The child brought up naturally had her teeth perfect; but in the case of the child fed by the bottle the incisors were very peculiarly worn. They were not decayed, but were wasted. From that I thought that the action of the sugar must have been felt upon these teeth, because otherwise the two children were so analogous in condition. It struck me very much that there was some action through the mode of feeding that acted upon the teeth that had not acted upon the other. You certainly do find the children of the poor with teeth very much decayed. I always questioned the parents as to the amount of sweet stuff they took, and they repeatedly made use of the expression, they gave them that to keep them quiet when they were out. But although I do not doubt that sugar affects the teeth materially, I think that there is some difference between the teeth so affected and those the result of stomatitis.

Mr. Henry Lee stated that in other diseases, such as fever, we do not know those diseases by any one symptom. It is not the skin, it is not the pulse, it is not the secretion, it is not the tongue; it is no one symptom that would enable us to say, "*that* is scarlet fever," "*that* is typhoid," "*that* is typhus." It is the combination of symptoms by which we are guided in all these cases. We cannot select any one symptom by itself in any one disease that is diagnostic *per se.* With regard to the pathology of syphilis generally, I may say that in its primary, secondary, or tertiary forms there is no one symptom that can ever be said conclusively to be diagnostic of the disease. In the primary symptoms the induration certainly is not. Something resembling it may be produced by a great variety of causes. The enlargement of the inguinal glands may also be produced by a great variety of causes, and cannot *per se* be considered as diagnostic. In the secondary forms the eruptions upon the skin may be simulated by a great variety of other affections. And so with regard to the tertiary forms of the disease: they may all, if you take them one by one, be produced by other causes. Therefore I should think it a very wonderful thing if so-called syphilitic and mercurial teeth should, when taken alone, be considered diagnostic of syphilis. My own impression is that anything that impairs nutrition at a particular age—whether mercury, syphilis, or scrofula—will produce an analogous condition of the teeth. Great injury might, I believe, be done to the feelings of parents and families if we took it for granted that because you have certain conditions of teeth, therefore that patient's parents must have been syphilitic; and I think this society especially ought to be very careful before it adopts the conclusion that by any one symptom in the tooth, whether want of enamel or notch, any case can be said to be syphilitic. I know very well indeed that inherited syphilis may impair the nutrition of teeth, and I am quite sure that some of the effects of syphilis may go through a second generation, and I would instance particularly affections of the mucous membrane of the nose. But I would in the interests of society, and having regard for the feelings of parents, beg this association to pause before it really puts its stamp upon the idea that any malformation of the teeth by itself, independent of its history, is diagnostic of either syphilis or mercury.

Mr. Napier.—Mr. Chairman, I feel that I have rather a difficult duty to perform in replying to all the observations which have fallen from the different gentlemen who have taken part in the discussion upon "the condition of teeth commonly known as syphilitic," which I had the honor of introducing at our last meeting; but as the evening is already far advanced, and Mr. Coleman has also a paper to read, I shall be forgiven for condensing as much as possible the remarks that I have to make. Dr. Drysdale expressed his astonishment that one so conversant with teeth as myself should have failed to notice the difference between the teeth mentioned by Mr. Hutchinson. He stated also that his own faith in the theory propounded by that gentleman was so confirmed, and the cases which had come under his notice so satisfactory, that he had given up inquiring into their history, as his custom had been previously, believing it to be unnecessary when certain marks were present. In reply to his criticism I will only say that it is solely in consequence of the experience which twenty-three years' familiarity with various conditions of the teeth and mouth has given me that I feel myself forced to reject the theory which he supports; and I cannot but think that in giving up the investigation of the history of cases he shows a tendency to accept too readily a conclusion of the truth of which many besides myself are skeptical. Mr. Francis Mason's opinion I was pleased to find in perfect unison with my own; his testimony being especially valuable, owing to his large hospital experience and the character that he bears as a careful and accurate observer. Mr. Coleman, who, upon the whole, agrees with Mr. Hutchinson, said that his experience had certainly been that the form of teeth alluded to had almost invariably been associated with patients who had inherited syphilis from one or other parent—almost invariably, for there had been one or two exceptions. Now, as the first question I propounded was, "Can inherited syphilis be diagnosed with absolute certainty from any peculiar condition of the teeth?" I think you will agree with me that the evidence afforded by Mr. Coleman, including as it does his acknowledgment of the existence of various exceptions to the rule he inclines to lay down as absolute, goes far to justify my skepticism as to the correctness of his conclusions. Mr. Hamilton Cartwright gave it as his opinion that I was mistaken in laying stress upon the fact that the teeth of the first dentition are seldom, if ever, affected; his own study of the subject leading him to consider that this is just what we ought to expect, seeing that calcification commences in utero—a period when specific inflammation does not occur. If congenital syphilitic evidences were unknown, I should readily allow the force of this argument; but as we all admit that infants are born with various imperfections attributable to syphilitic taint, I repeat that I attach great significance to the rarity of this peculiar mark upon the teeth of first dentition, connected indissolubly as it is in the minds of some with hereditary syphilis when it presents itself in the second: and I would again venture to suggest that this phase of the subject is one that demands elucidation. Mr. Risdon, whose remarks showed that he had carefully investigated the subject, holds, I was glad to find, views similar to my own. We now come, sir, to Mr. Jonathan Hutchinson's able exposition of his views, and I am sure that I express the feeling of all the members present when I say that we feel ourselves to be under a deep debt of obligation to him for his kindness in coming to the meeting of our society, and in giving us the benefit of his experience. Mr. Hutchinson expressed some surprise that I did not produce a number of casts or series of cases illustrating my reasons for disbelieving in syphilitic teeth. He has, I fear, somewhat misunderstood my argument. I did not say that syphilis did not ever affect the teeth, bringing about a condition that may entitle them to the designation of syphilitic, but what I do hesitate to accept is the assertion that a certain peculiar semilunar notch in the two upper central incisors is an infallible proof of inherited syphilis. Cases are worthless unless their history is complete, and my belief still is that its attainment in public or private practice is almost impossible. Casts are valueless for the same reason, and therefore I did not produce any at the last meeting. I have very carefully considered all that Mr. Hutchinson has said upon the subject, and am forced to confess that I am more than ever opposed to the adoption of his theory. Where a semilunar notch exists, a very indefinite history of syphilis in the case of one parent seems to be held to be sufficient proof of the origin of the disfiguration, and to render superfluous any inquiry into the condition of the other, who may be highly strumous, rickety, or (if the mother) incapable of giving proper nourishment to the child affected. But so rare is the occurrence of this blemish in proportion to the frequency of syphilitic indications that I am myself rather inclined to seek its origin in other causes, in combination with, or even apart from, the one to which it is, as I think, without sufficient consideration by many attributed. Among the sequelæ of diseases—of scarlet fever, for example—may be classed, I myself believe, many disfigurations of the teeth; in exemplification of which I have here a small model, taken since we last met, from the mouth of a young lady whose teeth show a strong tendency to develop the peculiar semilunar notch, the enamel having it well defined, though the dentine is only slightly affected, and this blemish, I have good reason to believe, is attributable entirely to a severe attack of scarlet fever in early life. Dr. Southey, who was to have been here this evening, has sent me a letter, in which, after expressing great regret at his inability to be present, he gives me permission to bring forward this case for him. He says, "I am acquainted with a large family of sons and daughters, all by the same father, but by a first and second marriage. Out of ten children born to the first wife, and six born to the second, none were known to have had any eruption or snuffles in early infancy. The first teeth of all the children were good and sound. One of the children by the first wife (the eighth born) had second teeth which might be described as answering completely to Mr. Hutchinson's description of syphilitic teeth. Of the six children by the second wife, five grew up, and two of them have second teeth which might be called syphilitic. But here comes the important feature. The children who had wet-nurses, or who were nursed by their mother, have well-formed second teeth; those who were brought up by the bottle or hand, nearly if not altogether from the first, are those that have the syphilitic-looking teeth. The children who were subjected to ill-feeding suffered from indigestion, and were treated to frequent doses of calomel, as I happen to know for certain. Malnutrition, therefore, I conclude, at the time when the second teeth are being born and bred, is the cause of the so-called syphilitic aspect of them. That syphilis is often the cause of malnutrition at the same period of life, makes it the not infrequent cause of the self-same bad second teeth; but it is neither the sole cause nor the explaining cause, in my opinion." We are indebted to Mr. Warrington Haward for some very interesting remarks upon certain conditions to be found among factory children who have come under his immediate observation, and they for the most part tend (if I understand him rightly) to magnify rather than diminish the difficulties of diagnosing syphilitic teeth. Mr. Henry Lee, whose opinion, like that of Mr. Hutchinson, is of exceptional value, regards the subject, I am gratified to find, from the same point of view as myself. And I must, for my own part, confess that I am still unconvinced by any argument that has yet been adduced in favor of the recognition of a set of rules by which the origin of certain appearances of the teeth may be rigidly determined, my own experience leading me to incline to attribute rather to a complication of several causes effects that are at present believed by many to owe their existence to one only. It is much that we may look forward to a fuller and more searching investigation of the subject; and from what I know of Mr. Hutchinson, I may answer for his readiness to fulfill his promise of affording us all the assistance in his power. Fully satisfied though he may himself be of the correctness of the opinions he at present holds, he will think no less of us for withholding our acquiescence until the theory is proved to our entire satisfaction. Time will only allow me to thank you, in conclusion, for the kind attention with which you have listened to my remarks, and briefly to express my sense of the obligation that we have been laid under by the readiness with which our distinguished visitors have come forward to help us in an interesting and important debate.

The Chairman.—I am sure we must thank Mr. Napier for the paper that he has read to us; and we must also thank Mr. Hutchinson for coming here to give us the benefit of his valuable opinion. When a gentleman has taken so much pains as Mr. Hutchinson, and has seen so many cases, and has looked into the question so deeply, his opinion, of course, is of very great value; but still it may be possible that as the subject is further looked into we may have more light thrown upon some of the phenomena which have not been accounted for quite satisfactorily. I am sure it will be for us to accord our best thanks to the author of, and the speakers upon, this most interesting paper.

Mr. Alfred Coleman read a paper on that form of dentigerous cyst dependent upon a misplaced tooth. He accounted for the eruption of the teeth by the growth of the maxillæ from their nutrient centers to their circumference at which absorption of bone took place. The old theory that the eruption of the teeth was due to the growth of their fangs, he agreed, in common with Dr. Baumé (over whose researches he did not claim priority), was quite incorrect. Applying this theory to dentigerous cysts, it seemed clear that when a tooth became impacted between the roots of its fellows it would, after a time, when the process of bone-formation became less vigorous, become quite detached by the advance of the surrounding bone to the surface, a space being thus left, into which serous fluid, under atmospheric pressure, would be effused.

Mr. Hamilton Cartwright.—Mr. Coleman's paper is of very great interest, inasmuch as there have been so many theories as to the pathology of dentigerous cysts. I have brought with me two or three interesting specimens, which I think will assist to aid our views with regard to the method of their formation. Mr. Coleman speaks of the walls of the cyst as being composed of the walls of the enamel organ, but I think that the latest theories on dental development invalidate such a conclusion, whilst it does not seem more probable that the fluid is effused between the enamel organ and the cuticula dentis. My own impression is that the parietes of such cysts are formed by the remains of the capsule within which the tooth was developed; and the accompanying unique and remarkable specimen seems to support this view. You will see that it represents a right superior maxillary bone in which the antrum is exposed, that cavity being filled with an osseous cyst perfectly developed, in the interior of which is a supernumerary tooth, with all its tissues, including the enamel, absolutely perfect. The walls of this cyst are probably the remains of the primitive dental capsule, converted into bone by a process somewhat similar to that by which the tissues of the developing tooth become calcified, whilst in the present case effusion took place from the interior of the sac, separating it from the tooth within, the capsule itself becoming ultimately calcified. These other specimens seem to point to a like conclusion, which seems to be much more simple than the generally accepted theories as to the enveloping membrane around teeth included in such cysts; and in cases like that exhibited, the sac from which the cementum is probably formed—a tissue very analogous to bone—would be far more likely to be converted into bone, as in this specimen, than the remains of the enamel organ.

Mr. Napier.—I should like to ask Mr. Coleman what was the condition of the tooth when removed in the case that he alludes to,—that is to say, the development of the tooth: was it a dead tooth without vitality, and if so may we not consider that cysts of this kind are possibly produced solely and entirely as the result of the tooth having been so retarded in its development as to become a foreign body, creating so much irritation and inflammation as to form round it a cyst in which it is afterwards found enveloped?

Mr. Coleman.—I am sorry I have so little to reply to. In the first place, I do not think we can lay great stress upon one particular interesting specimen that Mr. Hamilton Cartwright has shown, namely, that of a tooth apparently developed in the antrum in the center of a cyst projecting in that cavity which has become calcified. It is a very abnormal position for a tooth to be found in, and, more than that, it is the only instance on record of a cyst being found to have undergone calcification. With regard to the other views, I certainly should myself incline to think that a cyst is formed from that which has been the remains of the enamel organ. We are well aware of the theory that the tooth appears to be perfectly distinct, and even separated to a slight extent, from the enamel itself, and that it is into this cavity the serous fluid is diffused, and that the serous fluid is at a certain period carried away from the surface of the enamel, leaving a space in which naturally the easiest material would find access, namely, the serum from the blood would be diffused. In reply to Mr. Napier, my belief would be, in those cases in which surgeons cut into a cyst of this kind, and find a tooth, the cone of which simply projects into the tooth, there would be every reason to believe, though I have never been able to verify the fact, that that tooth would be a living tooth,—that is to say, it would have both nerves and vascular connection with the other parts; but in a case in which the cyst is cut into, and the tooth is found lying at the bottom of the cyst, we should naturally suppose that it is not in the same condition, that there is no vascular connection kept up with it, and the tooth is to all intents and purposes dead; but I would not say that when the cyst forms the tooth still retains its vitality. It may be owing to the death of the tooth that some morbid action is set up, by which the cyst is formed; but in thinking over this most probable cause, to my mind, of the eruption of the teeth, it seems at the same time to offer an explanation of this form of dentigerous cysts.—*Report of Association of Surgeons Practicing Dentistry, in Medical Times and Gazette.*

Ranula.—Ranula is admitted by all surgeons to be a most troublesome and, in many cases, a most intractable affection. It is sometimes so little amenable to treatment, that some surgeons, and among them the celebrated Dupuytren, contrived different means by which to keep open a fistulous orifice in the tumor, in order to empty the contents of the latter in the mouth. Jobert de Lamballe endeavored to effect the same object by inverting a portion of the internal surface of the ranula, and uniting it by a suture with the mucous membrane surrounding the orifice. M. Panas, of the Lariboisière Hospital, finding these methods of treatment unsatisfactory, and after having given a fair trial to the different remedies in vogue for the cure of this affection with equal unsuccess, has lately resorted to the practice of injecting these tumors with a solution (one to ten parts) of the chloride of zinc, the results of which are most encouraging. M. Panas injects into the tumor from three or four to eight or ten drops of this solution, which also varies in strength according to the age of the patient, and this he does with a Pravaz's syringe without previously emptying the tumor. But it is not only to ranulæ that M. Panas applies this treatment; he has found it successful in other tumors of the mouth, and thinks it may be advantageously employed in all cases of mucous or serous cysts, in whatever part of the body they may occur.—*Paris Correspondence of British Medical Journal.*

On the Treatment of Ranula.—The Paris correspondent of the *British Medical Journal*, in his last letter, draws attention to the treatment of ranula, and alludes to the success attending injection of chloride of zinc, as practiced by M. Panas. I might observe, without entering into the morbid conditions leading to obstruction of a sublingual gland or duct, that, practically, the surgeon's intention is to make a permanent opening in the sac, one which will allow the saliva continuous and natural exit into the mouth. It occurred to me, some years ago, that the use of a metallic seton, acting, to some extent, as a drainage-tube, would attain this object; and as two cases (both children) came under my notice, I tried the following operation. An ordinary suture-needle, carrying medium-sized silver wire, having been passed directly through the sac-like tumor from one side to the other, the ends of the wire were brought forward, twisted together, and cut off, leaving a small ring of metal half within and half externally. The wire was allowed to remain three weeks, then cut and withdrawn. It caused no irritation or impediment, and a patent orifice remained after removal. Both cases were permanently cured. The ordinary seton, made of silk or hemp, necessarily sets up inflammation, and may induce subsequent closure or fistulous aperture. Injection of caustic fluids, as chloride of zinc, in ranula is open to objection, as destruction of tissue is not desirable, at least in simple cases of obstruction. The plan I suggest is worthy of extensive trial, as it promises to supersede those hitherto adopted.—*Thomas H. Morton, M.D. C.M., in British Medical Journal.*

HINTS AND QUERIES.

I WOULD be glad to learn through the DENTAL COSMOS whether there is any reliable local application for lessening the pain caused by the extraction of teeth. I dislike the use of general anæsthetics, and would be glad to adopt some local anæsthetic.—J. H. BURKS.

ANSWER TO R. F. CONCERNING ABSCESS OF CHEEK.—The description offered of his case by R. F. is not sufficiently clear to furnish an exact clue to a diagnosis, yet we trust to be able to afford him the desired help.

Firstly, he is to recognize that no abscess arises or continues to exist without a cause. The principal causes of abscess of the cheek are, first, diseased teeth; second, impacted teeth; third, maxillary caries or necrosis; fourth, struma; fifth, breaks in the continuity of the duct of Steno.

In the description of the case given by R. F., we exclude the first of these causes, inferring the teeth to be in perfect condition; although in such connection mention might be made of a case just dismissed from the practice of the writer where a most threatening abscess was found to have origin in the dead anterior fang of a second molar, which tooth, to ordinary observation, seemed as vital as any of its fellows.*

Caries and necrosis are not unfrequent causes, and are easily distinguishable in the history of a case and through the use of the probe. A treatment of these cases is referred to in the February number of the DENTAL COSMOS.

Impacted dental organs, as a cause of buccal abscess, has reference principally to the wisdom-teeth; and just here it is that we incline to think will be found by R. F. the explanation of his case. Records in abundance exist of cases where abscesses have formed in the cheek, the cause being such impaction of the teeth, while at the direct seat of the primary lesion nothing at all was seen to be wrong. We would suggest that our correspondent use the probe, informing himself as to the direction of the fistule. If it passes to the neighborhood of the ramus of the jaw of the diseased side, let him make close inquiries as regards the tooth so situated. The writer once had a case where a fistule of the cheek led to the discovery of an unerupted wisdom-tooth, which lay almost directly at the apices of the roots of the second molar; and in another case a fistulous orifice of like situation on the face led to the discovery of a cuspid that lay at the inner angle of the orbital cavity. In still another instance a tooth, entirely disassociated with the bone, was found lying loose in the antrum. If this case be as we infer, the treatment will, of course, be modified by circumstances. If the impaction exists at the angle, it may be found all-sufficient to remove the second molar. If it exist in some other situation, it will also be well to remove a tooth nearest the neighborhood, and thus make a new tract of outlet for the pus; or it may be found all-sufficient to cut down on the involved tooth, removing it when possible, and when not, establishing a fresh sinus. We have little hesitation in asserting that the treatment of such cases is not unfrequently among the most difficult of the problems found in oral surgery.

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* In Garretson's "System of Oral Surgery," page 172–3, are notable examples in this direction.

Struma, as a cause of buccal abscess, finds explanation in the history of this particular case. A difficulty, however, which may confuse lies in an occasional conformity of scrofulosis and carcinoma ; a mistake is apt to be fatal to the patient.

Struma has its history written over the body, at large, of a patient so affected. Local abscess, when associated with the buccal region, has origin from the glands which immediately overlie the submaxillary triangle ; or it may be that the degeneration is of the submaxillary gland itself; such cases are sufficiently frequent to have afforded oral and general surgeons a wide experience in this direction. It is important to distinguish whether a forming abscess of such relation be external or internal to the superficial leaflet of the triangle. A difference is to be distinguished by the shape assumed by the swelling. If the superficial gland be the one that is breaking down, the resulting swelling will present a diffused appearance ; if the submaxillary itself be the gland involved, the tumor will be triangular. In opening into the triangle for the purpose of venting pus, the surgeon is not to forget the position of the superficial jugular vein.

Abscess associated with a break in the continuity of Steno's duct requires for its treatment a skill which is only to be obtained by practice. The operation required is complex. The different modes will be found elaborated in the work before referred to, and to which R. F. is referred.—A. B. C.

Answer to Johnson, who inquires concerning the virtue of Belladonna as a remedy in Odontalgia.—Belladonna not unfrequently acts like a charm in toothache arising from an exposed nerve ; before applying it, the cavity of the tooth is to be washed with warm water ; the application, in the form of the extract, is to be applied directly to the nerve, a piece the size of the smallest pin-head being all-sufficient. Atropia, the active principle of the belladonna plant, is, however, a more convenient manner of use. The solution used is one grain of the salt dissolved in one ounce of water. It is applied on a tuft of cotton.—A. B. C.

Answer to Maine, who queries concerning Erysipelas.—Erysipelas, it is not to be denied, is a formidable antagonist to meet. In treatment we prefer, in the first instance, to get clear of a cause which is the provocative ; but when that is not possible we esteem that the nearest approach to a specific resides in the following combination. It is to be painted over the part every hour, until the skin is seen to wrinkle :

℞.—Tinct. ferri chl., ℥ss ;
Tinct. cinchonæ, ʒiss ;
Quiniæ sulphatis, ʒss. M. —A. B. C.

Answer to W. E. Driscoll.—The focal distance of a simple lens being one inch or one-eighth inch, it magnifies a definite amount. A compound achromatic one inch or one-eighth has not the same focal distance, but it magnifies exactly the same that the simple lens does of that denomination. This is in both cases independent of the eye-piece. If this does not fully answer the question of Dr. D., let some one else respond through "Hints and Queries."—J. G.

Reply to W. B. K., Towanda, Pa.—If you wish to avoid an incorrect "bite," seize the patient by the chin with the right hand and bear heavily toward the base of the head, asking the patient to relax muscular control of the jaw. You cannot get it back too far, unless you break the jaw. Holding the jaw thus, request the closing of the mouth, when the wax will be impressed. You can then have the patient play the jaw up and down easily several times, so that you may know it is right.—G. H., *California*.

METRIC SYSTEM OF WEIGHTS AND MEASURES.—This system is so called from the *Meter*, which is its principal and only arbitrary unit.

The *Meter* is the unit of length, and is equal to 39.37079 English inches,—about *three* feet *three* inches and *three*-eighths of an inch. The *Square Meter* is the unit of measure for small surfaces, as a floor.

The *Are* (pronounced *air*) is the unit of surface, and is equal to the square whose side is ten meters, and contains 100 square meters, or 119.6 square yards. Used in land measure.

The *Liter* (pronounced *leeter*) is the unit of capacity, and is equal to a regular cube, whose edge is a decimeter or the tenth part of a meter; it contains 1.0567 quarts, liquid measure.

The *Stere* (pronounced *stair*) is the unit of volume, and is equal to the cubic meter, which contains 35.3144 cubic feet.

The *Gramme*, or Gram, is the unit of weight, and is equal to the thousandth part of a liter of pure water, and weighs 15.434 grains, Troy.

After the principal unit of each denomination is determined and named, the names of the higher denominations are found by prefixing the *Greek* numerals, *deka* (10), *hecto* (100), *kilo* (1000), and *myria* (10,000), to the name of the unit.

The names of the lower denominations are formed in like manner by prefixing the *Latin* numerals, *deci* (.1), *centi* (.01), and *milli* (.001).

NOTE.—Kilo is pronounced kĭl′o; deci, dĕs′e.

MEASURES OF				PROPORTIONS.
LENGTH.	SURFACE.	CAPACITY.	WEIGHT.	
Millimeter.	(not used.)	Milliliter.	Milligram.	1000th part.
Centimeter.	Centare.	Centiliter.	Centigram.	100th part.
Decimeter.	(not used.)	Deciliter.	Decigram.	10th part.
METER.	ARE.	LITER.	GRAM.	UNIT.
Dekameter.	(not used.)	Dekaliter.	Dekagram.	10 times.
Hectometer.	Hectare.	Hectoliter.	Hectogram.	100 times.
Kilometer.	(not used.)	Kiloliter or Stere.	Kilogram.	1000 times.
Myriameter.	(not used.)	Myrialiter.	Myriagram.	10,000 times.

The whole of the multiples and subdivisions of the Metric system are decimal, and the reduction from one denomination to another is performed by merely placing the decimal point so many places to the right or left, according to the terms of the required denomination.

LENGTH.

10 Millimeters (mm.) = 1 Centimeter.
10 Centimeters (cm.) = 1 Decimeter.
10 Decimeters (dcm.) = 1 Meter.
10 Meters (m.) = 1 Dekameter.
10 Dekameters (dkm.) = 1 Hectometer.
10 Hectometers (hm.) = 1 Kilometer.
10 Kilometers (km.) = 1 Myriameter (myrm.).

CAPACITY.

10 Milliliters (ml.) = 1 Centiliter.
10 Centiliters (cl.) = 1 Deciliter.
10 Deciliters (dcl.) = 1 Liter.
10 Liters (l.) = 1 Dekaliter.
10 Dekaliters (dkl.) = 1 Hectoliter.
10 Hectoliters (hl.) = 1 Kiloliter.
10 Kiloliters (kl.) = 1 Myrialiter (myrl.).

WEIGHT.

10 Milligrams (mg.) = 1 Centigram.
10 Centigrams (cg.) = 1 Decigram.
10 Decigrams (dcg.) = 1 Gram.
10 Grams (gm.) = 1 Dekagram.
10 Dekagrams (dkg.) = 1 Hectogram.
10 Hectograms (hg.) = 1 Kilogram.
10 Kilograms (kg.) = 1 Myriagram (myrg.).

10 Myriagrams (myrg.) = 1 Quintal.
10 Quintals (q.) = 1 Tonneau (t.).

SURFACE.

100 Square Millimeters (sq. mm.) = 1 Square Centimeter.
100 Square Centimeters (sq. cm.) = 1 Square Decimeter.
100 Square Decimeters (sq. dcm.) = 1 Square Meter (sq. m.), or 1 Centare.

100 Centares (ca.) = 1 Are.
100 Ares (ar.) = 1 Hectare (ha.).

WEIGHTS.	EQUIVALENTS IN GRAINS.	APPROXIMATE TROY WEIGHT.
1 Milligram equals	.0154	1-65 gr.
1 Centigram “	.1543	1-6 gr.
1 Decigram “	1.543	1½ grs.
1 GRAM “	15.434	15 grs.
1 Dekagram “	154.340	2½ dr.
1 Hectogram “	1,543.402	3 oz. and 100 grs.
1 Kilogram “	15.434.023	2½ lbs.
1 Myriagram “	154,340.23	26 lbs., 9 oz., and 4 dr.

1 Quintal equals	220.46 av. lb.
1 Tonneau “	2204.6 “ “

MEASURES (CAPACITY).	EQUIVALENTS.	
1 Milliliter equals	16.231	Minims.
1 Centiliter “	2.705	Fluid dr.
1 Deciliter “	3.381	Fluid oz.
1 LITER “	2.113	Pints.
1 Dekaliter “	2.6417	Gallons.
1 Hectoliter “	26.417	“
1 Kiloliter “	264.17	“
1 Myrialiter “	2641.7	“

MEASURES (LENGTH).	EQUIVALENTS.	
1 Millimeter equals	0.0394	inch.
1 Centimeter “	0.3937	inch.
1 Decimeter “	3.937	inches.
1 METER “	39.37	inches.
1 Dekameter “	393.7	inches.
1 Hectometer “	328	ft. & 1 in.
1 Kilometer “	3280	ft. & 10 in.
1 Myriameter “	6.2137	miles.

MEASURES (SURFACE).	EQUIVALENTS.	
1 Hectare (10,000 square meters) equals	2.471	acres.
1 Are (100 square meters) “	119.6	sq. yards.
1 Centare (1 square meter) “	1550	sq. inches.

THE

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 119.)

While discussion still continues as to the various theories of tooth-formation, it is nevertheless universally admitted that the *formation* of the dentine of the crowns and the *continuance* of the growth of both dentine and cementum of the roots of teeth is possible only with the presence of a living pulp.

It is also conceded that the *nourishment*, for the far greater part, at least, of dentinal tissue after strictly physiological formation has occurred is due to the workings of this organ.

Also, that the recuperative effort which may result in recalcification of partially decalcified dentine is dependent upon a vital pulp.

Also, that the further diminution of, and final, almost complete filling of the pulp-cavity with secondary dentine is the duty of the dental pulp during the decline of life; thus maintaining the usefulness of the teeth even after the entire crown has been worn away by attrition or lost by decay, or has succumbed to the combined influence of both; and that this usefulness shall be the complete serving of still vital organs.

As we shall advance in the study of dental pathology it will be necessary that all this should be well understood, in order that the ready deviation and easy gradation on the part of pulpless teeth from *seemingly* physiological conditions into more and more grave pathological complications, *without very apparent cause*, may be clearly appreciated.

It is, however, sufficient for our immediate purpose that we recognize, with all these future infractions upon normality, the possibility of so treating such teeth as that they will be tolerated, and will very well subserve the purpose of ordinary mastication for varying periods of five, ten, fifteen, or twenty years, and sometimes for even more, according to the age, health, strength, and resisting capability of the individual.

But even now it is important that attention shall be directed in a general way to the fact that this *toleration* is dependent upon the vitality of that membrane which surrounds the root or roots of a pulpless tooth.

To this periodonteum is accredited the function of nourishing the cementum or cortical covering of the dentine of the root on the one hand, while by its peculiarity of structure it also becomes the periosteum lining the alveolus, and the medium for the nourishment of the bony walls of this cavity.

Thus it is that upon this membrane solely now depends the continuance of vitality in that tooth-tissue which alone remains vital (the cementum), while upon that vitality rests the *living attachment* of the tooth to the general economy.

The cementum being then the only tissue retaining life after the devitalization of the pulp, it must be remembered that the dentine and enamel are now dependent upon their inherent qualities of density and perfection of organization for their resistance to disintegrating influences.

It is due to this that the translucency of the crown of the tooth is lost; that its color is markedly modified, usually becoming darker, and sometimes quite dark; and it is also in this connection that such changes occur in the characteristics of decay, as to point with considerable force to the action of vitality as a concomitant influencing dental caries.

This is shown in many instances where caries continues steadily to advance, notwithstanding the introduction of excellent fillings as attempts to arrest its progress, until in process of time the pulp-cavity has been so far encroached upon and the pulp itself so exceedingly shocked and irritated as to have either succumbed, dying what is termed a "natural death," or to have rendered necessary, as a relief from infliction, the devitalization of the pulp, when it is noticed as year after year passes that *much less tendency* to decay exists.

On the other hand, we, however, also note that some teeth which resist decay measurably well during the continuance of pulp-vitality seem actually *to melt away* in despite of the most earnest efforts for their preservation so soon as their pulps have ceased to live.

We are thus permitted to accept as possible the lengthy duration of pulpless teeth, particularly when these are of fairly solid structure, and yet we are compelled to admit as possible the unfortunately rapid disintegration of tissue deprived of the protection of nourishment.

When uncontrollable pulp-irritation demands the devitalization of that organ it may be accomplished: 1st. By cauterization. Caustics were formerly classified as *actual* and *potential*, the actual referring to the heat of fire, the potential to such compounds as possessed the power of producing eschar. 2d. By instrumentation, as broaching or puncturing. 3d. By partial luxation of the aching tooth. 4th. By the use of appropriate medicinal applications.

1. *Cauterization.*—At the present time this method of pulp-devitalization may be regarded as confined to the actual cautery.

The application is a very old one, and was evidently the main reliance of those who performed this operation a century since.

The method consisted in carefully removing, by drills and other instruments, that portion of dentine obstructing the entrance into the pulp-cavity; and, having done this, a fine wire was thoroughly heated and quickly thrust into the pulp. Repeated thrusts were given, if necessary, until all sensibility was removed.

It may seem strange that so primitive and painful an operation should have for a very long period held its place in the list of means for destroying the dental pulp, but it has been quite considerably employed until within the recollection of many practitioners now living.

At this time it is almost obsolete, performed as indicated, but the *electric cautery* is still occasionally experimentally used with varied reports as to success or failure.

The use of the potential caustics, as caustic potassium, nitrate of silver, lunar caustic (argenti nitras fusus), common caustic, Vienna powder, and the like, has gradually been completely abandoned, as the employment of other "medicinal applications" has been found more generally satisfactory.

2. *Instrumentation.*—This operation consists of immediate or gradual puncturing of the pulp by a broach or probe, either with or without the adjunct of a medicament.

Immediate broaching of the pulp is at present admissible only in the superior central incisors and cuspids, with the occasional addition of a broad, large-rooted, lateral incisor.

Instead of its being desirable that the temper should be drawn from the broach or probe used for this purpose, I regard it as better that the additional strength of an excellent spring temper should be given the instrument.

The broach should be as large as is compatible with the size of the pulp to be broached, and should have a diameter just below its point equal to about one-fourth of the diameter of the entrance to the canal. It will be found that the gradual taper of the ordinary broach (watch-makers') will thus give a diameter, *after its insertion*, which will rather more than half fill the orifice, thereby insuring an obtunding compression of the pulp in addition to the wound of puncture, and yet permitting the sudden and free rotation of the broach which should *instantaneously* follow its equally instantaneous complete insertion.

At the hands of most practitioners this is a very painful operation, and one which extorts from patients decidedly objectionable expressions of opinion; but it is so far from this at the hand of an *expert* that, with the proper preliminary preparations, two, three, or four pulps are broached in but little more than as many seconds with but the slightest possible pain to the patient, and with scarcely an audible exclamation.

As but few operators are so constituted as to attain the degree of precision and celerity necessary to the satisfactory *broaching* of pulps of even the very limited number of teeth in which it is regarded as proper, it is much more usual to insert a hooked probe gradually and gently along by the side of the pulp until the greatest distance possible is reached; and then, by a sudden turn of the instrument, excise the pulp at its fine attenuation. In some cases this can be done with comparative facility; but as even this is frequently painful, and indeed unendurable, I have suggested the idea of painless pulp-devitalization by means of *medicated puncture*. This is done with a probe of hair-like fineness, pointed with the finest possible point; a point beyond the power of the naked eye to appreciate, but which can readily be produced with the aid of a magnifying-glass. It is essential to the success of the operation that the point shall be *excessively acute.*

For the proper pointing of these probes, the temper should be carefully drawn by the usual method of gradual induction of redness and much more gradual process of cooling. Having thus obtained the best possible combination of softness and toughness, the point is made with a "dead-smooth" file moved lengthwise from the shaft toward the point. By means of the magnifying-glass it will be found that even with the utmost care an enlarged and *comparatively* blunt end is the result; this tiny end is then cut off with sharp scissors, and finished by laying it upon a metallic surface, and most delicately pointing it with a fine-grained stone,—Scotch or Arkansas stone.

The cavity of decay having been dried, and the ingress of saliva having been prevented by means of napkins, or, better, the rubber dam, a *liberal portion* of the ordinary acetate of morphia paste, or, in cases of extreme sensibility, a paste of acetate of morphia and dental tincture of aconite, is placed *freely* over the pulp.*

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* The dental tincture of aconite is made by adding to two ounces of ground aconite root two fluidounces of officinal tincture of aconite; shake it frequently

Having covered the pulp thoroughly and deeply with paste, commence the gentle pricking of the medicaments into its periphery, moving the probe in and out, *making but superficial puncture.* It is during this part of the operation that the most caution as to progress is to be observed, for a minute or two (by the watch) thus spent in very superficially introducing the obtunding paste will almost painlessly place most pulps in good condition for comparatively rapid puncturing. This after-puncturing is done by a continuance of the gentle inserting and withdrawing of the probe, gaining a little after *each few insertions* (not trying to gain with each thrust), and advancing with an effort to so cultivate the sense of touch as to appreciate by this means the sensations of the patient, and thus keep well within the bounds of very moderate infliction. The complete success of any attempt at this method of pulp-devitalization will of course depend entirely upon this education of touch, but my clinical experience is that to any one of average perception a reasonably satisfactory result is not a difficult attainment.

During my occupancy of the Chair of Pathology and Therapeutics I used frequently to demonstrate this operation, particularly in cases where arsenical applications had proved unavailing, and where immediate broaching was inadmissible, as in multirooted teeth difficult of access.

One of the most decidedly satisfactory *clinical* illustrations of the occasional utility of this method was in the case of a patient having an exceedingly useful and equally painful tooth with an exposed pulp, over which capping had been unsuccessfully tried, and in which arsenic had been applied as thoroughly and as properly as is possible for several weeks consecutively without any appreciable effect.

This patient was selected for clinical demonstration, and in a little less than fifteen minutes the ends of all three canals (left superior first molar) were comfortably reached by acupuncture, after which the entire pulp-tissue was painlessly extirpated.

It was my pleasure some ten years since to afford at once relief and a personal demonstration of this operation to my esteemed friend, Dr. J. E. Garretson, in the painless devitalization and extirpation of the pulp of the left superior lateral, together with the immediate filling of the tooth, the entire operation consuming less than an hour. I report this tooth as having been in active service ever since, and as giving promise of so continuing (cotton canal filling).

I would mention here, parenthetically, that it is not my usual practice to fill teeth immediately after extirpating the pulp, except for

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during a couple of months or more, and then evaporate the tincture to a semi-syrup consistency by air-drying.

certain reasons, or under certain circumstances, which will be given in place; my preference being in favor of allowing a few days for the establishment of that modification of circulation which naturally results from removal of the pulp before indulging in such further mechanical infliction as may produce increased irritation.

It will be found in some rare instances that even the most delicate manipulation for acupuncture will give an amount of pain not easily endured; in such cases I avail myself of my "dental helix," with the usual large proportion of success.

I wish again to caution against the *abuse* of this instrument, and to urge the utmost care and circumspection in operating during its employment. I feel the importance of impressing this advice here, as I may not have occasion to speak of it again for a long time. I have recommended its utility in superficial sensitive dentine, but suggest that it be used carefully, and abandoned as soon as it has subserved its purpose, that the sensation of pulp-approach may be had to warn of danger. I have recommended it in cavities of greater depth, containing soft and very tender semi-decayed material which it is regarded desirable to remove; here it is still more important that caution should be ever exercised, as a fair pulp-exposure may be made without other notice than the sudden flow of blood from laceration of that organ. I now recommend it to obtund pain in the broaching, the excising, and the acupuncture of pulps; and would warn against all undue violence or excess in the performance of these operations during the running of the current.

Particularly while using the exceedingly fine point for acupuncture should one be guarded that the point be not passed through the apicial foramen, thus unnecessarily and *unfortunately* wounding external tissue, and, at the same time, incurring the liability of breaking off the fine end of the puncture-probe.

(To be continued.)

THE HOMOLOGY OF THE DENTAL TISSUES, THEIR SUSCEPTIBILITY TO SUPPRESSIVE ECONOMY, AND THEIR PRESENT DEGENERACY IN MAN.

BY A. H. THOMPSON, D.D.S., TOPEKA, KANSAS.

PART I. HOMOLOGY.

THE epithelial origin of the teeth is now one of the demonstrated facts of dental embryology. Histology has ceased to prosecute investigations as to the location of the birthplace of these organs, having established our first proposition beyond controversy, but is now devoted in this department to the minutiæ of the process of their genesis.

The mucous and epithelial membrane of the mouth is the tissue from which they arise, and transformed epithelium cells the basis structure of their organization. This is tersely described by some of the standard authors as follows: Frey (Histology, etc.). "The teeth are the production of the mucous membrane. . . . The dental germ corresponds to the papilla of the mucous membrane which becomes inclosed in the parietal portion of the follicle, as with a sheath of the latter. Both these structures have their origin from the proper tissue of the mucous membrane of the fœtal jaw." Or Owen (Odontography): "The dental pulp is always the first developed part of the matrix, and makes its appearance in the form of a papilla, budding out from the free surface of a fold of the mucous membrane of the mouth." Or Wedl (Pathology): "The first indication of the commencement of the development of the germ (of the tooth) is afforded by a proliferation of the epithelium structure of the mucous membrane covering the edges of the maxillary arches in the form of a fold," etc. Or Mr. C. S. Tomes (Dental Anatomy): "About the fortieth or forty-fifth day in the situation corresponding to the future alveolar border there appears a slight rounded depression extending the whole length of the jaw, it and its elevated borders being formed by an increase in the thickness of the layer of epithelial cells, while on transverse section the proliferation of epithelial cells is found to have been more energetic in a direction downwards into the substance of the jaw than it is upwards, so that a *cul-de-sac* of epithelium dips into the embryonic submucous tissue."

While all recent authors agree in assigning the origin of the teeth to the mucous membrane, they differ as to their morphological relationship and tissual homology. Like many other tissues, the study of the constitution of those of the teeth is fraught with peculiar difficulties, and has been productive of no decisive classification with any special family of tissues. The facts of their epithelial origin and semi-osseous structure, though seemingly incongruous, do not constitute a physiological antithesis, nor do other elements of their organization, either chemical or histological, that are apparent contradictions, militate against an intelligent classification. Studied from analogy, and by the recent illumination that evolution has thrown upon all biological subjects, we may perhaps arrive at a conception approaching the truth.

The fact of the epithelial origin of the teeth, taken with other facts also to be noted, indicates the probable truth of the proposition that the teeth are most nearly related and belong to the family of "epithelial," or "dermal," or "corneous" tissues, and that they are, in fact, a modification of the exo-skeleton for food-obtaining purposes.

As long ago as 1823, Hensinger, in his "System der Histologie" (Owen), advanced the hypothesis of the relationship of the teeth to the corneous system, but it gained little ground among histologists until a recent period. It was opposed by most investigators of the last half-century, who insisted upon the osseous structure of the teeth evidencing their relationship, as their intimate mechanical connections seemed also to indicate, with the endo-skeleton. Recent investigations, however, point to a different hypothesis, and promise a revolution among prevalent ideas, and the success of the exo-skeleton theory. Like all innovations that succeed at the expense of old and widely-accepted theories, it has heretofore and must still fight its way.

In the higher forms of animal life, the *enamel* is the main and important element of the tooth, and for the work of which the remainder of the tooth was erected, the dentine and cement being secondary tissues, organized and developed for the support of their crown and king, the enamel. That some animals, lower forms, do not possess this tissue, or some in but slight quantity (Tomes), does not inveigh against the hypothesis. In these forms it is plain that the dental structure partakes of the general degradation of the organization, and only fills its sphere in the series of development. The enamel has not yet appeared, and the dentine must fill the office and perform the labor of the higher tissue until evolution shall, in progressively higher forms, sufficiently differentiate the organization to allow of the production of higher tissues. The advent of enamel is either partially or entirely in prospective, and until it is actual in higher forms, a tissue of lower organization, the dentine, must in lower forms endure the friction and shocks of use in the employment of the teeth. Thus it is that in the highest forms this important tissue, the enamel, is a prime element of the tooth, and it crowns the mature organ in a developmental as well as in an embryological and mechanical manner. It is the working tissue, and is exposed to all the forces of mastication, which in the higher forms is a highly specialized function. The study of the origin and development of this, the hardest and most dense tissue of the economy, through the various phases of growth, would be exceedingly profitable if the necessary knowledge for its prosecution were attainable. It appears to have been originated by a necessity for a more resisting structure as the function of mastication became more specialized, which was met by the calcification of an epithelial structure, as such, upon an ossified tissue of partial epithelial origin. Evolution thence elaborated its special form under increasing demand for a dense tissue, until it reached the height presented by the enamel in the higher forms of animal life.

The dentine and cement in man are but secondary and supporting tissues, and occupy an inferior position in the economy. They fill a merely mechanical office in upholding the enamel, and are essentially different in mode of origin, in structure, and in office.

That the enamel is a strictly epithelial structure is conceded and demonstrated by all recent investigators. It consists morphologically of calcified epithelial cells, elaborated for the endurance of an appointed work and service to the economy. This fact has been well established, but the analogical fact of its homology with other epithelial and corneous structures in other and important particulars is still something of an open question. The following quotations will assist in the elucidation of our hypothesis. Frey (op. cit.): "Huxley was the first to declare the whole enamel organ to be of epithelial origin. . . . The enamel is a decidedly epithelial production. . . . In transverse section of the enamel the prisms appear like a delicate tessellated pavement of five- or six-sided plates, reminding one of epithelium. . . . The external epithelium of the enamel organ may, perhaps, persist also in the form of the enamel cuticle. . . . In every two, four, or six per cent. of organic matter in the enamel we find no gluten on boiling. . . . The substratum of organic matter we find in the enamel cuticle is remarkable for its power of resisting acids and alkalies, and yields no gluten." This latter fact is of great importance, for upon the difference between the organic base of dentine and cement, which like the bone contains gluten, and that of enamel which, like epithelium and all corneous structures, yields *keratin*, much depends. We will notice this by quoting from the same author upon the nature of epithelium. "In epithelium of great thickness, the superficial layers of cells undergo chemical transformation to a considerable degree, owing to which they become converted into corneous matter or *keratin*, or, as the saying is, become horny. . . . The superficial scale formations . . . give the reaction of keratin . . . but yield no gluten on boiling." Again, on enamel, we quote Prof. Wedl (op. cit.): "Waldeyer states that the membrane, 'the cuticle of the enamel,' when burned, yields an odor resembling that of burnt horn. He was unable to detect any lime in it." Prof. Owen says (op. cit.) that "the enamel is a tissue *per se*. . The higher an animal is placed in the scale of organization, more distinct and characteristic are not only the various organs of the body, but the different tissues which enter into their composition, and this law is exemplified in the teeth," as we have before noticed. He is, however, opposed to the corneous theory of the enamel. Mr. Tomes (op. cit.), in speaking of "Nasmyth's membrane," says, "By staining with nitrate of silver, a reticulated pattern may be brought out as though it were made up of epithelium cells." This appearance may, however, he says, "be due to the pittings made by the ends of the enamel prisms;" but this, we contend, is highly improbable. Again, "the singular power of resistance to reagents . . . proves nothing more than that it is a tissue imperfectly calcified," etc.; but in this it is like most epithelial structures. Mr. Tomes upholds the cemental origin and character of the enamel cuticle, which hypothesis, even if it should become established, would not alter the conception of the essential nature and characteristics of the enamel as a purely epithelial structure. But until otherwise proven, we hold that the enamel cuticle is a "cornification" of the residue of the enamel organ (after Waldeyer), an organic structure of uncalcified epithelium. Even "Kölliker, who dissents strongly from the views of Waldeyer, and admits some uncertainty as to its nature, provisionally regards it as a continuous and structureless layer, furnished by the enamel cells after the work of forming the fibrous enamel was complete."

Tomes furnishes us with the following evidence upon the nature of enamel (op. cit.): "The enamel organ is entirely derived from the oral epithelium, . . . and whatever products it may give rise to are obviously to be regarded as epithelial structures; but it is the enamel organ alone which is directly derived from the epithelium; the origin of the dentine germ is quite distinct. . . . The essential portion of the enamel organ is the layer of 'enamel cells' which by their calcification give rise to the enamel. . . . The cells of the internal epithelium (enamel cells) form an exceedingly regular and perfect columnar epithelium, the individual cells becoming by result of this mutual apposition very symmetrical hexagons." Or Carpenter (Physiology): "The enamel itself proceeds from the direct calcification of the columnar cells (of epithelium) . . . and thus, as Huxley first demonstrated, the enamel is a petrified epithelium."

Sufficient has been quoted from authorities to indicate our meaning and to substantiate our hypothesis, *i.e.*, that the enamel being of undoubted epithelial and dermal origin and construction, it is amenable to the laws that govern and the peculiarities that characterize the corneous and dermal structures. This dental element would no longer be the histological puzzle it now is, if it were viewed in this light, and its specific classification in the family of corneous tissues would lead to a better understanding of its idiosyncrasies for practical and professional, as well as for physiological and philosophical, purposes.

The *dentine*, on the other hand, we propose as being more nearly allied to the osseous than to the corneous structures, to the endo- than to the exo-skeleton. This is in harmony with and supports our theory of its being a secondary and supporting tissue to the enamel. It is the primitive dental tissue, "for in tracing the teeth back in the animal kingdom to a rudimentary form, in the order of their development, it is found to occur earlier than enamel or cement" (Wedl, op. cit.), and would therefore be expected to more nearly resemble bone originating at an era of life when differentiation of structure was at a minimum. Quoting Frey again (op. cit.), we find that "the nutrition of the whole tooth takes place from the pulp as from the Haversian canals of bone. . . . The dentine must be looked upon as a species of bone without true bone-corpuscles, and with a more regular course in its canaliculi. . . . The canaliculi correspond further with those of bone in having a special lining layer which is thicker in the latter, . . . they also divide and communicate, though in other respects they differ, owing to their more regular course. . . . Comparative histology teaches us that the osseous tissues of many bony fishes supply intermediate forms between bone and dentine, and that in no inconsiderable number of those the latter appears in the place of osseous tissue. . . . Dentine consists, like bone, of a gluten-yielding substratum, rendered hard by a considerable excess of calcium and also magnesium salts. . . . The walls of the canaliculi of dentine globules are not convertible into gluten, thus resembling the lacunæ of bone and their ramifications." Or Mr. Tomes (op. cit.): "The organic basis of the matrix (of dentine) is closely related to that of bone, with which, however, it is not identical . . . being firmer, and does not readily yield gelatin; . . . the dentine sac and the dentine organ are identical, and spring from the submucous tissue (of the jaw); they contrast with the enamel organ, which, as before said, is derived from the oral epithelium. . . . They originate in the midst of solid embryonic tissue, at a distance from the surface." Without multiplying quotations, we have evidenced the conviction of scientific investigation upon the subject of the position of dentine in the classification of dental tissues. Looked upon as nearly related to bone, being, in fact, but a modified form of bone, and performing a secondary office in the economy of dental organization, the solution of the problem of its life seems more apparent.

The *cement* is undoubtedly an osseous tissue, closely related in structure, as in mechanical juxtaposition, with bone. It is one of the graded series of tissues connecting enamel with true bone, and resembles both the latter and dentine. Quoting Tomes again (op. cit.), we find that, "both physically and chemically, and also in respect of the manner of its development, the cementum is closely related with bone. . . . Vascular canals corresponding to the Haversian canals of bone are met with . . . in thick cementum . . . The matrix is a calcified substance, which, when boiled, yields gelatin, . . . and is in fact practically identical with that of bone," etc. Its connection with and relation to dentine, and the relation of both to true bone, is illustrated by Frey (op. cit.) as follows: "Any distinction of the softer *Crusta-petrosa* from dentine is doubtful. It only shows a somewhat more organic substratum yielding gluten; its nature is otherwise similar to dentine. . . . Dentine represents a modified bony substance, and the cement is developed upon it in the same manner as a younger periosteal layer upon an older, while the communication between the canaliculi of the tooth and those of the bone occur in a way analogous to that taking place in concentric growths of bone. The cement arises from a growth of the inferior portion of the dental sac, the latter being converted into osteogenetic substance as in the growth of the periosteum, and undergoing diffuse calcification. . . . The residue of the dental follicle persists as the periosteum of the alveolus." Or Owen (op. cit.): "The cement corresponds almost identically with true bone, is a well-organized tissue, and always corresponds with the modification of the osseous tissue of the skeleton in those animals in which it occurs. In osseous fishes it has not radiated calcigerous cells; but in reptiles where these are present in bone there is close conformity in the cement to their size and shape in both tissues. The bony relationship and homology of cement is thus established with considerable certainty, and we observe also how it passes gradually into dentine, as dentine does into enamel in some fishes." But, we make the distinction that enamel is *not* a bony structure,—is *not* related to bone in any of its characteristics, nor resembles it in any element of structure, except in being hardened by calcium salts, and in this it differs largely in chemical composition. The prisms are said to be related to the "tubuli" of dentine,—compressed "tubes," as it were,—which by reactive pressure assumed angular shape. But this theory does not dispose of the osseous matrix of the tubuli, which is absent in enamel; it does not dispose of the indurated sheaths of the canaliculi; it does not account for the sudden transition of the organic base of dentine from a gluten-yielding material to a keratin-producing substance in enamel. We therefore advocate the probability of the enamel being a homologue of the corneous tissues, and the dentine and cement of the osseous, and that the teeth are merely an anatomical combination of tissues of both the endo- and the exo-skeleton for the purposes of food reduction. In support of this we may revert to the quotation from Tomes, where he shows that the enamel and dentine pulps arise from distinct though related tissues,—the former from the epithelium of the mucous membrane of the mouth, the latter from the submucous tissue, thus embryologically establishing the relation of the one to the derm, and the other to bone.

We do not then assume that the teeth *in toto* are epithelial structures, but that the enamel alone is entirely and purely so. The controversy between the older histologists was upon the assumption, on the one hand, that the entire tooth was closely related to epithelial tissues, and this extreme theory was successfully combated by Owen and others of the osseous school. The following quotation from Owen (op. cit.) upon this subject possesses, possibly, more of historical than argumentative importance and interest, as some of the points upon which he takes issue, as the laminar theory, are now exploded, and his sweeping denunciation of the theory of the dermal character of the teeth makes no distinction between the organization of the several dental tissues upon which we base our hypothesis. "Until a recent period the analogy of dentine with bone was supposed to be confined to their chemical constitution and the nature of the hardening material; while the arrangement, as well as the mode of deposition of the firm tissue, was considered to be wholly different from that of bone, and the dentine to agree in its general nature and mode of growth with hair and other extra-vascular horny parts, with which most teeth closely correspond in their vital properties. Tooth-structure was regarded as simply laminated, and the ivory was described as being formed layer within layer, deposited by and moulded upon the pulp. . . . From the illusory traces of laminated structure observed in vertical section of the teeth, etc., a succession of cones was observed into which a tooth is resolved in decomposition. . . . True bone presents concentric lamellæ in decomposition and alternate layers in madder-fed animals. . . . Laminated structure has not a constant appearance. . . . The class of tissues in which teeth should rank has frequently been a subject of controversy in systems of histology, the fact being overlooked that they have not the same unity of composition as bones or epidermal appendages. One constituent of the teeth, viz., the cement, ought to rank with the osseous tissues. As the dentine, which was lately described as being 'like hair, arranged in concentric layers,' possesses, on the contrary, a closer structural resemblance to bone, and with almost identical chemical composition, its modifications which I have called 'vaso-dentine' and 'osteo-dentine' forming intermediate gradations between the hard dentine and true bone. . . . Hensinger admits the relation of the teeth to the corneous tissue is not clearly elucidated in human anatomy, but he affirms that it is most conclusively established in that of the lower classes of animals. No doubt in tracing the modification of the dental system through the animal kingdom we find true horny productions substituted for teeth in certain vertebrate species, as in the ornithorhynchus, whale, tortoise, etc. So likewise the office of teeth is performed in the articulate class by parts (modified as to form) of the crustaceous and chitinous integuments. But I know of no transitional or intermediate structures, such as Hensinger alludes to, between teeth, and nails, horn, or hair. The lamellar disposition traceable in the texture of the hardest dentine is much more closely similar to that of bone, especially to the concentric plates surrounding the Haversian canals, than to the texture of nails. The structure of the tooth of orycteropus is essentially like that of true teeth; the apparent resemblance which it presents to the horn of rhinoceros or to baleen arises from its being compounded of many minute, parallel, elongated denticles.

"The close resemblance in intimate structure and chemical composition between true teeth and bones being established, it may be observed that the osseous tissue is not confined to the endo-skeleton; it is developed largely to form the exo-skeleton in many fishes, in the loricate reptiles, and even in the mammalian class, as, for example, in the armadillo (Dasypus) where, to strengthen the integument, bone is substituted for horn, which forms the scaled armor of the allied pangolins (manis). Now, the relation of the teeth of the armadillo to that of the ornithorhynchus is precisely analogous to that which subsists between the osseous plates of the armadillo and the corneous scales of the pangolin; but this relation no more establishes identity of tissue or system of tissues in the one case than in the other.

"The general form of the dental matrix, and its relation with its calcified product, bear a close analogy with those of the formative organ of hairs, bristles, and other productions of the epidermal system. In these the papilla or pulp is developed from the external skin; in the teeth, from the mucous membrane or internal skin. Teeth further agree with the extra-vascular appendages of the skin in being shed and reproduced, sometimes once, sometimes frequently, during the life-time of an individual; the latter may be termed 'interrupted' reproduction. In some cases again, as in certain epidermic appendages, the reproduction of the tooth is uninterrupted, and goes on during the life-time of the individual, new matter being added to the base as the old is worn away from the apex, or working surface, of the tooth. A tooth when fully formed is subject to decay, but has no inherent power of reparation. A tooth of limited growth can only increase in size after its formation is completed by abnormal growth of its most highly organized constituent, the cement. Thus, then, it appears that the analogy of the dental organs to those of the corneous system holds only in their mode of development (the cells and fibers of the horny tissues are formed in and not excreted from the surface of their formative pulps), in their shedding and reproduction, and in their exposure to external influences and to contact with extraneous bodies; but the antlers of deer are similarly exposed, and are likewise shed and reproduced annually and also contemporaneously with the fall of the hair; but antlers are not therefore classed with the corneous tissues any more than is the bony case of the horns of cavicorn ruminants."

Many of the facts Prof. Owen notes contribute to the support of our theory, and notably so in the comparison of the tissues of the endo- and exo-skeleton. As osseous tissue occurs in some positions in the exo-skeleton, it is also true that dentine sometimes occurs in such locality; but they are both developed, when so occurring, from the *subdermal tissues*,—a very important and significant fact. "Nails, hair, teeth, and feathers are developed from the upper layer of the derm, but scales (of fish) within the substance of the derm itself. . . . In the ganoid scales we find a substance like true bone forming the basis of the scale. . . . In the placoid scales a series of dermic teeth are commonly found . . . which closely correspond to the structure of dentine in true teeth." (Bradley, "Comparative Anatomy.")

Or opposed to Owen, we would also submit the later investigations of Tomes (op. cit.) as supporting the theory of the dermal origin of the teeth, the epithelial relationship of the enamel, and the osseous homology of the dentine and cement: "The mucous membrane which lines the alimentary canal is continuous with—is, indeed, a part of—the external skin, with which it blends at the lips. . . . A young dog-fish just about to be hatched . . . has no distinct under lip, but its skin turns over its rounded jaw without interruption. The skin outside carries spines (placoid scales), and these are continued over the jaw into the mouth, being a little larger here. The spines become developed to far greater size than those outside, and the identity and continuity of the two becomes somewhat masked.

"No one can doubt, whether from the comparison of adult forms or from a study of the development of the parts, that the teeth of the shark correspond to the teeth of other fish, and these again to those of reptiles and mammals. It may be clearly demonstrated that the teeth of the shark are nothing more than highly developed spines of the skin; and, therefore, we infer that all teeth bear a similar relation to the skin. This is what is meant when teeth are called 'dermal appendages,' and are said to be perfectly distinct from the internal bony skeleton of the animal. . . . All teeth alike are developed from a part of the mucous membrane, and any connection which they may ultimately get with the bone is a secondary matter. . . . In the young dog-fish . . . . can be demonstrated the homological identity of the teeth and the dermal spines. . . . The dermal scales and protective spines of fish are often made up of a tissue much resembling dentine. . . . Any great abnormality in the hair goes hand-in-hand with an abnormality of the teeth. Thus, there is a breed of dogs in Turkey which are almost hairless, and which have very few teeth, their dentition being reduced to a single molar on each side, together with a few incisors. . . . The edentata, abnormal in their skins, are different from most other mammalia in their teeth. . . . And in the human subject, inherited baldness has been found to be associated with inherited deficiency of teeth; . . . but, on the other hand, redundance of hair has in several cases been accompanied by absence of teeth. . . . But we must not go further than to say that great abnormality of the teeth and hair go hand-in-hand." Or Carpenter (op. cit.): "Partly in accordance with the general fact that epithelial growths die and are cast off, to be replaced by others formed beneath them, . . . two sets of these organs (the teeth) are developed. . . . In tracing the development of the teeth they are found to be essentially dermal structures which have undergone calcification, the epithelium forming the enamel, and the mucous tissue the dentine and cement."

Recent investigations thus contribute to the establishment of the hypothesis we advance, but we need quote no more to indicate this, for sufficient has been brought forward to show the bent of recent thought. But yet one more interesting instance of evidence in our favor is furnished by Prof. Owen (op. cit.) in a curious investigation; *i.e.*, in the histological study of one of those remarkable anomalies in pathology,—an ovarian tooth. He thus describes it:

"To ascertain what modification of structure the dental tissues might present in teeth which are sometimes developed with hair and portions of bone in the human ovarium, I examined, microscopically, one of those ovarian teeth. The intimate structure of dentine, enamel, and cement was entirely identical with those of the ordinary maxillary teeth. The dentinal cells and tubes presented the same dimensions, etc. . . . The enamel was unusually thick, the fibers having the usual form, structure, and direction. The cement became unusually thick at the closed end of the fang, and there formed the medium of adhesion between the dentine and a small portion of bone."

The author does not note, however, what would seem to be the morphological lesson taught by this remarkable coincidence of the production of tissues of such opposite homologies in such intimate juxtaposition. To us it indicates much that we consider evidence in our favor in showing the tissual position of the teeth and their morphological relationship with the endo- and exo-skeleton. It is beautiful and wonderful indeed that these tissues should be so perfectly produced in such a foreign and anomalous position. The relation of such products in the ovary to the origin of a fœtus is noteworthy, and especially so where the pathological growth should take such a remarkable form, being confined to the elements of the hard tissues, the products of highly organized and primitive membranes, and notably the derm.

We notice, as favoring our hypothesis, (1) the unusual growth of normal enamel, in relation to and in the presence of hair, pointing to an abundance of corneous tissue material; (2) its connection with normal dentine, its natural support, and which connects it with the endo-skeleton,—the dentine being in this (as when in normal position in the jaws, and showing this characteristic here in a new and peculiar manner) the connecting link between enamel and bone, between the endo- and exo-skeleton, between the corneous and osseous tissues, in regard to the teeth; (3) the connection of dentine to bone by the usual cement, the hypertrophy of the latter, owing to the abundance of bone, etc. The transition from bone to horn, from gluten to keratin, seems quite perfect, and exhibits here the connection of the graded tissues of the teeth.

(To be continued.)

SOME OF THE PHASES OF RIGGS'S DISEASE (SO-CALLED).

BY GEORGE A. MILLS, BALTIMORE.

ARTICLE 2.

I DO not propose in what I have to say on this subject to arrogate to myself an antagonistic spirit to any of the methods, complete or otherwise, practiced by the profession in meeting, or trying to meet, the requirements in the treatment of the disease under consideration. I write as the result of some thought, some observation, and some experience, but more from the testimony which I have received from numerous sources, and which has convinced me beyond doubt that the so-called disease is generally considered a myth, and the remedy advised a useless performance.

If I succeed in provoking intelligent observation of the asserted facts, and an unbiased discussion of them, I shall be content.

All fair-minded practitioners will agree with me that the trouble which has come to be called Riggs's disease has not hitherto responded to the various methods of treatment which have been recommended and practiced. I refer especially to its more advanced stages; and yet it is no uncommon thing to find that it is overlooked or neglected even in its early and manageable manifestations, and that not only when it is in situations comparatively out of view, but when it is in full sight. As I stated in my first paper, I have heard its presence denied by intelligent operators, when a little pressure upon the gums would demonstrate beyond cavil the mischief it was causing. I know there are many in our ranks who are profoundly impressed with the importance of maintaining the general health of the mouths of their patients, and ready and willing to avail themselves of every hint which promises to assist in so doing. I know, too, others, and not a few, who have acknowledged that they were aware of the mischief going on, but lacked faith in any effort to put a stop to it.

This statement of course refers to the advanced stages of the trouble, as, for instance, where it had progressed to such an extent as to loosen one or more of the lower incisors.

If any one is interested in this matter and is in doubt, let him look in the mouths of his patients, and he will find the evidence before long, even if he have not good eyesight.

Let me ask attention to some of the first expressions of the trouble. It is not uncommon to find it in the mouths of very young patients, say even those of two years of age. The deposit can be seen, and its presence is also manifested by a more or less distinct line of inflammation about the necks of the teeth. The simple removal of the calculous deposit will restore the parts to health, and a little care on the part of the mother or nurse will prevent its reappearance. When first deposited it is very soft and can be easily removed.

The disease is frequently to be found in an advanced stage, where, because of the tenderness arising from the presence of the concretion, the brush has been used less vigorously; while on an adjoining or antagonizing tooth, where the brush has been faithfully used, there is little, if any, evidence of it. It is often to be seen on the labial, proximate, and cervical portions of the inferior incisors, though not uncommonly the former portions will be clear and the latter otherwise; probably because the brush has been employed in the usual manner—crosswise instead of lengthwise—and thus the deposit has not been reached, and, in course of time becoming more dense and impinging on the soft tissues, has caused them to become congested, giving rise to the common remark, "My gums bleed so easily."

At this stage the congested gum will completely cover the deposit, and the mischief will progress insidiously but rapidly. But, like other workers of evil who delight to carry on their enterprises in the dark, it cannot escape the keen eye of an accomplished detective.

This stage of the disease is one of the most important, because generally overlooked. "The little foxes spoil the vines," "A stitch in time saves nine," are adages which apply forcibly at this juncture. An intelligent appreciation of the situation, and a little faithful work, will effect a radical cure, and subsequent intelligent care on the part of the patient will prove a barrier to its reappearance.

I have indicated the locality where this deposit is frequently to be found in the mouths of young patients, but this is not the only place where it may be looked for. It is frequently to be found between the bicuspids, underlying the festoons of the gums, giving them a bright red or a dark-blue or purple color. This latter is generally accompanied by a full or strained appearance of the margins of the gums, and a little force will rupture them, giving occasion to a free bleeding, with temporary benefit to the parts, but not a cure; though a little faithful work at this juncture will rid the premises of a very bad tenant.

If not removed, this deposit, unlike some things which grow better by age, will go on hardening, clinging more tenaciously to the necks of the teeth, and extending its boundaries, limited only by the mechanical force which resists its growth in some directions, but permits it to creep downward without hindrance. It now assumes an entirely new phase. The soft tissues shrink or recede. The intruder has found new fields to conquer, and here a battle rages which it will require all our skill to prevent resulting in a defeat of all physiological conditions. It must be remembered, however, that the contest will be more or less prolonged, if allowed to proceed, according to the physiological activity of the individual organism. It may not be amiss to remark just here that the secret of all our success in the treatment of diseased tissues is in our ability to diagnose intelligently; to take into consideration the peculiarities of each particular case.

In the stage of the disease now under consideration the intruder has attacked the hard tissues, and they are yielding, more or less rapidly, according to circumstances. The thin edges of the alveolar process are the parts now involved, and from the breaking down of their structure we have an easily perceptible discharge of pus, which does not help to keep up a normal condition of the fluids of the mouth.

This aspect of the trouble is to be found in the mouths of patients older in years than those first mentioned, though it is to be remembered that to a greater or lesser extent it is not absolutely a question of years so much as of constitutional condition. I have in mind one case in which the major part of the sockets of the six front teeth was destroyed,—the teeth of course much loosened,—and a free discharge of pus, the deposit being evidently the cause of the trouble; the patient only nineteen years of age. I refer to this fact because, while I was treating the case, I saw in the London *Monthly Review* an article by Mr. Charles Tomes, in which he says he has not seen this condition in the mouths of patients under thirty-five years of age. In this article he refers to his recent visit to the United States, and to his attention having been called to this matter by Dr. Riggs, who was at the time giving clinical lectures upon this disease at the Harvard Dental School.

(To be continued.)

PAINLESS COFFER-DAM CLAMPS.

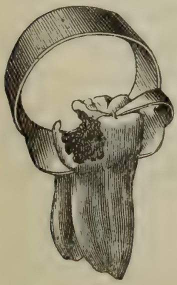
BY J. N. FARRAR, M.D., D.D.S., BROOKLYN.

In order to secure the popularity which brings success in our profession, there is no one thing of more importance than to avoid giving pain to our patients.

That care and gentleness on the part of the operator will go a long way in this direction is patent to all, yet the incompleteness of some of the little devices, by the assistance of which we perform our operations, renders it often impossible to do first-class work without inflicting more or less pain.

Probably there is no one instrument that patients dread more than the ordinary coffer-dam clamp, which bites down and impinges upon the margin of the gums. It is true that the shape of many teeth makes it necessary for the jaws of the clamp to take a deep hold, and in some cases to extend even beneath the gum, in order that it may not slip off. Indeed, some teeth are so conical that no clamp will remain secure long enough to allow the completion of an operation. But there are other teeth with crowns so large and necks so small that the jaws of the ordinary clamp will imperceptibly creep down from the crown to the neck in spite of every care by the operator, and will encroach upon the gum sufficiently in many cases to cause excruciating pain, and not unfrequently produces such injury to the gum that considerable pain will be experienced for a day or two after. That creeping clamps are necessary to the success of some operations where cavities are near or partially beneath the margin of the gum, admits of no question; but that in a large proportion of operations such pain or such a clamp is unnecessary, is equally true.

It is only necessary to use a clamp properly constructed, which, while being perfectly efficient, cannot do harm by creeping down. For the comfort of patients, and I may say of myself also, I have for several months used a set of clamps devised by myself with a view to overcome this difficulty.



It is accomplished by having an annealed ear or two ears projecting from the jaws of the clamp, so as to rest upon the grinding surface of the crown, and allow the jaws to remain at a desired fixed point on the side of the tooth without liability to creep down upon the margin of the gum.

To apply one of these, or in truth any clamp, it should be placed upon the forceps, and the jaws inserted through the rubber dam before placing it upon the tooth. After folding the dam around the shanks of the forceps it will be sufficiently out of the way of the operator to enable him to apply it to any tooth within half a minute.

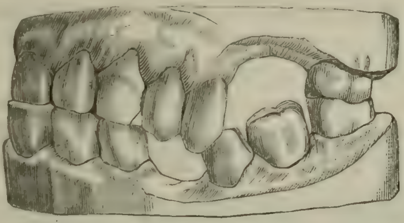
These painless clamps are made of different sizes and shapes to suit different teeth, some having one ear and others two; some suited to long crowns and others to short ones. From the set a clamp may be selected for each case, so shaped that the ear or ears will not be in the way of the plugging instrument. The object in having the ears annealed is that they may be bent to suit different lengths of crowns in rare emergencies; but if the operator has several sizes, there is little or no necessity for doing this. While I use a set of a dozen of these clamps, more than six are not often necessary. If one is to be used on trial, the one-ear molar clamp is the most useful.

The set consists of a right and a left one-ear (on one side only) molar clamp; a right and a left bicuspid clamp, with a bifurcated ear on one jaw only, and two molar clamps, having an ear on each jaw, one of the clamps suited to long crowns and the other for short crowns. These clamps are such a success that no dentist can afford to be without them.

PERMANENT SEPARATION OF PROXIMATE FILLINGS.

BY J. A. WOODWARD, D.D.S., PHILADELPHIA.

In the report of the Pennsylvania Association of Dental Surgeons, published in the February number of the Dental Cosmos, 1877, page 97, an operation is referred to where an attempt had been made to retain the space between two adjoining upper bicuspids on the plan proposed for the permanent separation of approximal fillings in the Dental Cosmos for June, 1875, page 296.



It will be observed from the cut that the superior bicuspids (the teeth in question) are driven together by the inferior bicuspids; the latter are in turn forced apart one quarter of an inch, this condition being favored by the loss of one of the inferior molars. The second inferior bicuspid and molar teeth are all in firm contact. An unusual amount of force is expended upon any means employed to retain the space between the superior bicuspids. The second one is of more importance in the matter of appearance than of service in mastication. When these teeth came under consideration they were in contact at least two-thirds of their proximate surfaces, and caries had progressed extensively beneath the enamel about the points in contact. They were first separated—entirely free of each other. The second superior bicuspid and the inferior second bicuspid were cut away to take off the pressure of the lower bicuspid. The cavities were filled even with their margins. A piece of gold wire little more than half a line in diameter was anchored into one filling and allowed to rest against the other, to secure the space and move the point of contact as near the grinding surfaces of the teeth as possible. In eighteen months the continued pressure drove the end of this gold wire into the filling in the first bicuspid, leaving a depression as perfectly as if drilled for it, the filling remaining intact in other respects. The space was of course entirely obliterated. An increase in the size of the gold wire would distribute the force over more surface of the filling in the first bicuspid, and the space be retained at the necks of the teeth for a greater length of time. Much larger surface to support this unusual force can be had by the restoration of the contour of the teeth.

This the demonstration indicates should have been done at first.

In offering the suggestion, June, 1875, it was intended to direct attention to the mere mechanical device, leaving the application to the judgment of the operator who might think sufficient of it to use it. It has been of efficient service where the patient cannot bear a prolonged operation, the fillings large and extending deeply beneath the gum, and the space between the teeth lost by repeated separation.

At times it is an extremely difficult matter in such cases, especially where all the teeth are present, to recover the original space at the necks of the teeth. As much as can be regained can usually be retained with comfort to the patient by the gold wire properly secured.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.—SIXTEENTH ANNUAL SESSION.

(Concluded from page 119.)

FOURTH DAY.

THE subject of Etiology was still under discussion.

Dr. Clowes said that the wisdom-tooth has a bad name, but it is the strongest of all the molars. The sixth-year molars have five or six weak places, the second molar two or three, while the wisdom-tooth has but one. If we retain the sixth-year molar, which is the weakest tooth, we keep the wisdom-tooth far back, where it is of no use. It is not a weak, but a badly cared-for tooth.

Dr. Frank Abbott. The six-year-old molar ought not to be extracted. A great many wisdom-teeth are of no use; they are often pegs, and often they do not come at all. If the first molar is extracted it causes the second to tip forward. He would rather take his chances of saving a tooth that is good for something. The wisdom-teeth are almost always outside of the arch in the upper jaw. He raises his voice in favor of saving the sixth-year molar. There may be cases when it should be extracted, but they are rare. We destroy the masticating arrangement, and the consequence is that we put food into the stomach merely with holes punched in it instead of being masticated.

Dr. Hunt, of Washington. If we wish to accomplish our mission, we must go back past disease and apply the means of prevention. There is a movement to unite the profession in collecting statistics, so that we can find out the cause of the deterioration of teeth, which it is our duty to find out, and apply the remedy. [The speaker alluded to the circular issued by the Dental Society of Maryland and the District of Columbia, which has been more fully mentioned in the proceedings of the American Dental Convention, published in the October (1876) number of the Dental Cosmos, page 535.—*Reporter.*]

Prof. Winder. The prehistoric races were subject to the same troubles as our own, but the intermediate races of South American Indians were not; out of twelve hundred there were only thirty-two cases of carious teeth, and a half-breed showed the only case of irregularity, and this was hereditary from the white blood.

Dr. McQuillen spoke of the contraction of the jaws of the present races as compared with our savage ancestry. Julius Cæsar found the inhabitants of Britain savage and beastly, which was an evidence of the truth of the Darwinian idea. The speaker then exhibited skulls of various nationalities, showing the peculiarities in the formation of the jaws. In the negro of a low type the jaws are wide and the front teeth prominent. The Australian jaw is much the same. In the Sandwich Islander and the American Indian there is a nearer approach to civilized life, but there is no contraction or irregularity. In Morton's collection of more than six hundred skulls there is not a case of irregularity to be found. This is due to the food on which these nations lived. They did not subsist on the delicate loin, but on coarse food, like the carnivorous animals. Nor did they live on food prepared for them. Teeth have an animal basis,—they are not made of phosphates and carbonates alone, and the animal portion must be nourished. There are phosphates and carbonates in meat. People, like teeth, are kept in place by having antagonists and some work to do.

Dr. Atkinson said he was on both sides of all questions, and agrees or disagrees with statements according to the position of the observers. We all know that there is a great deterioration of teeth in the best families. The reason is the difference in the mode of nourishment during infancy. The child was formerly nursed till it was able to eat food; the mother fed the baby with food which she had herself masticated and insalivated. This was the umbilical cord, the point of connection with the mother continued after birth. If the practice was taught in all nurseries it would have more influence upon future generations than anything else.

The subject was then passed.

The subject of Dental Literature was taken up, and a lengthy report read by Dr. M. S. Dean, the chairman of the committee. The reading proceeded for a considerable time, when a motion was made and carried that the reading be suspended and the paper referred to the publication committee, and the reading was accordingly suspended.

A volunteer paper upon the same subject was then read by Dr. W. H. Dwinelle, of New York.

At the conclusion of the reading the rules were suspended and miscellaneous business was taken up.

The committee on nominations made their report of committees for the ensuing year, which was accepted and adopted, as follows:

Physiology.—M. S. Dean, R. B. Winder, J. N. Farrar.

Pathology and Surgery.—I. Knapp, J. Taft, F. H. Rehwinkel.

Histology and Microscopy.—C. N. Peirce, E. D. Swain, H. C. Longnecker.

Chemistry.—S. B. Palmer, J. S. Cassidy, C. J. Essig.

Therapeutics.—C. A. Brackett, C. R. Butler, F. M. Odell.

Operative Dentistry.—G. H. Cushing, A. W. Harlan, F. J. S. Gorgas.

Mechanical Dentistry.—W. N. Morrison, F. A. Hunter, M. W. Foster.

Etiology.—D. C. Hawxhurst, M. H. Webb, H. L. Sage.

Literature.—W. A. Bronson, A. L. Northrop, E. A. Bogue.

Education.—Louis Jack, J. N. Crouse, Thomas Fillebrown.

Prize Essays.—W. H. Morgan, B. Lord, L. D. Shepard.

The special committee on dividing the association into permanent sections, which shall be analogues of the present standing committees, as recommended by Prof. Flagg, reported that they had considered the subject, and were unanimously in favor of the contemplated measure, but that they had not time at the present session to prepare such a report as was demanded; and they therefore recommended that they be permitted to continue their labors and report fully at the next annual meeting. The report was received and adopted, and the committee accordingly continued. [The committee consists of Drs. R. F. Hunt, Washington; W. H. Atkinson, New York; and W. H. Morgan, Nashville.]

The Executive Committee offered the following, which was adopted:

Resolved, That it is the sense of this committee that the writers of all papers which will require more than fifteen minutes in the reading shall make a synopsis of the papers which will not occupy more than that time, and that in such case the paper as a whole shall be referred to the Publication Committee.

The Publication Committee presented its report, which was accepted and adopted.

Dr. Taft moved that back volumes of the "Transactions" should be donated to libraries of dental colleges on application, postage being paid by the applicants. Carried.

Dr. Taft moved that the Publication Committee be instructed to advertise back volumes of the "Transactions" for sale at one dollar each. Carried.

On motion of Dr. Bogue, the vote by which the reading of Dr. Dean's paper was suspended was reconsidered.

The regular order was then resumed, and the reading of Dr. Dean's paper was concluded.

The subject of Dental Education was then taken up, and a report read by Dr. W. H. Morgan, the chairman of the committee.

The following is a synopsis of the paper:

Dr. Morgan's paper said that the last century is remarkable for nothing more striking than the progress of dentistry. Surgery, being an immediate necessity, had left dentistry in the background to await the social advancement from which its development must spring. Nothing more clearly marks the character of American civilization than the birth and growth of this science. The character of its future becomes a question of vital interest. Up to a late date its progress has been due to individual effort; but its development and appliances have become too extended for individual skill. Concentration of effort is the watchword of this centennial year. The work of accumulation is now even more important than investigation; manipulation, than evolution or production. We are in danger of the blocking of the path of progress by individual facts; we need arrangement, classification, order. This must be the work of organization, and not of an individual. The preparation of material for the assimilation of beginners should be the first office of teachers, and to this work such should address themselves. Dentistry is in its very essence part and parcel of general surgery; and the several branches which enter into its formation should be developed *pari passu.* These branches cohere by virtue of the broad principles which run like a thread through the ever-crystallizing beads of facts; and only by the concentration of these facts can they ever be seen in their true relations. Whenever dentistry degenerates into a system, independent of the fundamental principles which fix its relations to general surgery, its doom as a science is sealed. The shop-windows of the metropolis of the old world (and of the new as well), filled with the tools of the tradesman within and the ticketed rates of his labor, afford a lamentable example of the divorce of dentistry from general surgery and honorable medicine.

The high standard of some of our schools has done much toward professional elevation; but our work is incomplete. The relations between the graduates of medicine and dentistry, though pleasant, are not yet what they should be; nor will they be till dentistry is enrolled under the colors of general surgery. Am I going too far when I say that the degree of D.D.S. or D.M.D. should never be conferred except as an appendage to the broader degree of M.D.? Have we not the same right to the title of M.D. as the ophthalmologist or aurist, and are there not the same cogent reasons why we should possess it? The relations of these branches with medicine and surgery are no more intimate than that of dentistry. We surrender our just right when we give up the broad bearing of the one for the contracted signification of the other. Colleges, like liquids, arrange themselves according to their specific gravities. It is our purpose on this occasion merely to mark out the general bearings of dental education, and determine its true relations. Comparing English and German universities, Matthew Arnold has said that in the latter the effort is to bring all that is possible out of a man (educo—education—leading out), while in the former it is to cram all that is possible into him.

In the development of our system of dental education, we should strike the happy mean between the two. Facts are to be collected, classified, and presented in order to the student, and that impetus to original investigation should be given to him which only an enthusiastic appreciation of facts can impart. The contact of mind with mind does much to stimulate individual energy and thought. There is no truth in the universe that is not connected with every other truth; no science that does not interdigitate with every other science in the evolution of thought. We have our part to perform in this work of development. Our past may challenge the criticism of the world; but ours is not a positive science. New processes, new relations, new methods are constantly being evolved; the work of classification is vast indeed.

The countenance and support of the world are ours already; our science is regarded as one of the prominent landmarks of civilization, and the demand for its development is more and more imperative.

Let us not disappoint the hopes which have been raised, but by energy and wisdom carry the standard of our science into the vanguard of human progress.

The newly-elected officers were then installed.

The president, Dr. Keely, after a few words of thanks, appointed as the special committee of arrangements for the next session, Drs. Dean, Harlan, and Honsinger, of Chicago; and as members of the Publication Committee, Drs. Shepard, of Boston, and Northrop, of New York. The chairman of the Committee on Instruments and Appliances was, on motion, allowed to read his report on the boat in the evening, a motion to refer the report to the Publication Committee without reading having been lost.

After some unimportant miscellaneous business, the association adjourned to meet, as had been previously resolved, on board the steamer John A. Warner, for an excursion on the Delaware River in the afternoon.

The afternoon and evening were occupied in an exceedingly enjoyable excursion up the Delaware, returning past the city and proceeding down the river past the historic locality of Red Bank. As the steamer, with a large number of delegates, invited guests, and ladies on board, passed this point, Dr. C. A. Kingsbury, whose wife is a descendant of an old lady who resided upon the spot during the Revolution, and who continued her spinning in the cellar during the engagement which took place there, gave an interesting history of the occurrence. The company was then invited below, and an elegant repast was submitted to them, in which affair all took part, and to which ample justice was done. The evening was spent in a pleasant social gathering in the cabin, where speeches were made by several gentlemen, and the "light fantastic toe" was tripped merrily upon the lower deck, the boat meanwhile steaming up and down the broad river in the silvery light of the moon at its full.

The association was called to order at eight o'clock, and a brief session held, at which the report of the Committee on Instruments and Appliances was referred to the Publication Committee, as well as a volunteer paper, by E. Wilson, M.D., of Cuba, neither of which there had been time to read. An attempt was also made to reconsider the vote whereby the next meeting was fixed at Chicago, but it was lost.

After passing resolutions of thanks to the profession in Philadelphia for their courtesy and kindness in providing the entertainment and excursion, and sundry other resolutions of thanks, etc., the association adjourned to meet in Chicago on the first Tuesday in August, 1877.

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(Continued from page 140.)

THE following paper, entitled "Vis Vitæ," by L. C. Ingersoll, of Keokuk, Iowa, was read by the secretary.

Search for hidden things constitutes the chief of human activities. The *locking up* of secrets is the incentive to find the key. Many facts once hidden, and many secrets locked up from the generations now dead, are well known to the generation of the living. And although this generation has advanced a step and uncovered a few of the hidden things, we, too, shall pass, leaving behind us much that is uncovered, and many secrets hidden in the unmeasured realm beyond, which the next generation will view with the enthusiasm of original discovery.

With these axiomatic facts before us we sometimes stand peering into the future and wishing that the thread of life was longer, or that a centennial resurrection was the law of our immortal existence, and that marble crypts might give way every hundredth year, our cerementai bands be broken, and we be permitted to open our eyes on the discoveries which the swift-succeeding generations of men will make.

Our mettlesome minds, in their eagerness for the search for hidden things, are sometimes presumptuous enough to wish for only a centennial supplement of years, for the realization of the hope to grasp all knowledge.

These are truths merely hidden by time. Corn in the ear comes *after* the seed is put in the ground. There is a succession in the development which necessitates the passing of time; and we know that thereafter we shall see the corn in the ear, because we have perceived that successive stages of development from the seed is the established order of nature.

Much truth is, like seed, germinant in its character, and needs only time for its development into that cluster of truths which is the ripened fruit.

A mistake is possible here when we have discovered the germinant character of truth in general and its after-unfoldment in assuming that *all* truth is of this character, and needs only time and the ordinary process of development to bring to the surface and reveal to us its hidden nature.

This is as unphilosophical as to assume that because a plant can be taken from its native soil and by arboriculture grown to a shrub, and then to a tree, and because the tree can be grown fifty feet high, therefore it can be made to grow fifty thousand feet high. The *reductio ad absurdum* is an easy method of showing the fallacy of this assumption.

There are such conceptions as finiteness and infiniteness, comprehensibility and incomprehensibility. Our finiteness is a conscious fact, and, on intuition, asserts an infiniteness in the universe outside the range of our finiteness. Reason asserts that there must be truths connected with that infinitude of existence which our finiteness cannot comprehend. In other words, there are incomprehensible truths. Their incomprehensibility does not take them from the realm of facts. They are not simple, but complex facts, made up of the comprehensible and the incomprehensible,—a blending of finiteness and infiniteness. And the finite and comprehensible part which we *may* know is but the *binding* of the great book of the infinite and the incomprehensible which we *may not* know.

Such a complex fact is the *life* that pervades organic existence. Life is and ever has been the most mysterious and incomprehensible fact of the universe; and man has made no approach towards the citadel where the secret power is enthroned. The first man came as near to understanding what life is as have any of the philosophers or scientists of our day. It has *always* been a conscious fact, but no progress has been made towards unfolding its nature. Science has evoked all the learning of every age to unravel the mystery. Egypt, the cradle and the home of literature and science, employed her most astute thinkers to give to the world a clue to the beginning of organic development, which we call life. Hermes Trismegistus, one of the most noted of the learned men of ancient Egypt, whose works on philosophy and religion are said to have reached twenty thousand volumes or rolls, wrote the "Poemander," perhaps the only work of his extant, in which he gives an account of the creation and the nature of all things; but from it we learn nothing of what life is. The Phœnicians, who vied with the Egyptians in philosophic learning, left the world still in darkness on this point.

The scholastics of the Aristotelian age, who were renowned in all the world for their mental acumen, found out nothing that was worthy to be transmitted to after-generations concerning the nature of life,—nothing tangible or comprehensible which would answer to the "vital spark" within us.

The philosophers and scientists of modern times, of the class of Herbert Spencer and Tyndall, have, with a good degree of unanimity, accepted the definition of life given by Herbert Spencer as containing the sum of all the knowledge gained on this point by their immense research and analysis. Spencer says, "Life is the continuous adjustment of internal relations to external relations." President Hopkins, pursuing another line of investigation, has, with most untiring research and thorough analysis, and with profound wisdom, arrived at the convincing fact that "The boiling of water in a tea-kettle is *the continuous adjustment of internal relations to external relations*."

We may, therefore, be content to make no attempt to uncover the mystery that has eluded the penetration of so much learning and philosophic investigation from the earliest times till now. And I have no anticipation that through any *last analysis* of peculiar combinations, by which we arrive at molecules and atoms, life will appear to us any more tangible and any less mysterious.

But there is a large field before us to which I invite you, where nebular mists become circumscribed by definite areas, and vitalized matter has taken distinguishable forms, and life exhibits itself through an organic mechanism the most intricate and perfect; and here we may with profit study life by observation of the laws of its action and the results which are attained.

In an essay read last year before the Illinois and Iowa Societies I aimed to establish the fact that *alternation* is a *law of vital action.* This was based upon the following propositions, namely, that vitality is limited as an energizing force; that all parts of the animal organism do not pass through uniform stages of development during the same period of time; that functional action is not carried on equally in all organs at the same time, but increased activity in the vital processes of one organ necessitates a borrowing of vital force from some other organ in sympathetic relations with it, and a cessation or reduction of the vitality of the latter to supply the demand. The facts and illustrations there adduced made it evident that the periods of time when any organ is least vitally supported by this withdrawal of vital force were times when that organ is most susceptible to disease. On this theory of *alternate vital action*, and changed susceptibility under a law of nature to outward impressions, I attempted to explain various diseased conditions of the dental organs.

I purpose in this paper to notice several characteristics of vitality not then adduced, with their physiological and pathological aspects in relation to the teeth.

First, then, life is a force. It is not a condition of motion, but a cause of motion. In conformity with this idea we have in language various combinations and forms of words to express this commonly received fact; such as organic force, life force, life power, curative power; and we say of it that it *acts*, it *operates*, it *exerts*, it *performs*, etc. Vital force, as creative of motion, creates the most important distinction we know of in matter, and is the basis of the division of the entire universe into *living* and *dead* matter. There are no other conditions, forms, or characteristics of matter that can admit of such wide distinction, and no other human language that can express a wider difference in matter than the terms *living* and *dead*. Affirmatives and negatives are not more opposite to each other, and extremes cannot be farther apart than life and death.

Again, vital force which imparts motion to matter and transfers it from the division of *dead* matter to that of *living* matter is distinct from the motion itself; so that we can in no rational sense say that life is *motion*. It sustains to it the relation of cause to effect. This relation implies succession. The motion *succeeds* the pervasive presence of vitality, and must therefore be distinct from it. As an organic force it builds up organs and maintains their functions. In its pervasive nature it pervades the whole organism by pervading every minutest part while itself is not divisible into parts like the organism. We have no knowledge of vitality as a something made up of individual parts. We may take away from an organism a distinct and definable part, and by so doing lessen the whole; but we cannot affirm that by the same act we have taken away a like portion of the vitality of that organism.

Again, from the pervasive unity of vitality springs its curative power. By this I mean a vital resistance to any interruptions or disturbances of it as an organic force. In other words, vitality not only establishes but maintains function. Strictly speaking and rightly comprehended, there is no curative power outside of the organism itself. This I repeat. *There is no curative power outside of the organism itself.* This power is sometimes called "nature." The only acceptable theory which will cover the whole range of medical practice is written in three Latin words, *vis medicatrix naturæ*,—the remedial power of nature.

Dentistry never encountered any serious obstacle to progress until it arrived at the consideration of the teeth as vitally organized, and that, too, with a vitality that is to be respected. In the early days of mechanical dentistry the vitality of the teeth was ignored, except as indicating extraction. Operative dentistry, too, at the start, was almost as wholly mechanical as the manufacture of false teeth. Any vitality that stood in the way of the high mechanics of the operator must be crushed out. In our day the cure of those diseases of the teeth that affect their vitality is the chief concernment of the profession. At the doorway of the citadel of life in the dental organs the dentist is commanded to stop and consider. Dentistry has had its eras of progress which may be distinctly marked as the *mechanical*, the *surgical*, and the *therapeutical*. In the first era the practitioner was styled simply a "*dentist*." In the second era he styled himself "*surgeon dentist*." Or, wishing not to ignore the former, he put out his sign written "*surgical* and *mechanical* dentist." His badge of professional standing was D.D.S.,—doctor of dental *surgery*. In the therapeutical era to which we have now advanced we see the badge D.M.D.,—doctor of dental *medicine*, or M.D.,—doctor of *medicine;* and on professional cards we find printed "dental physician." These are singular indices to denote progress, but they tell of the full acceptance by the profession of the present as the *therapeutical* or vital era. *Treatment* preparatory to the surgical operations of dentistry has for years been the main subject of discussion in dental societies and dental journals.

Let it be borne in mind that if cure is possible the healing power is in the organism itself—that medicine of no kind and in no form has any potentiality as a curative power. While therefore it is true in every just sense that nature performs the cure of disease, it is also true that the vital functions wherein resides the curative power are influenced or caused to act from without. Such influences from without we call excitants or stimulants. It appears quite evident that every organ is dependent for its healthful action upon certain natural stimuli. Light, heat, electricity, water, and food are among the natural excitants to vital activity. There are natural and there are artificial stimuli. The lachrymal glands secrete the tears under the influence of grief. This is a natural stimulus. A grain of sand thrown into the eye, causing a flow of tears, is an artificial stimulus. The presence of food in the mouth is a natural excitant to the flow of saliva. The touch of dental instruments causing the same, or a more profuse flow, is an artificial excitant. The presence and near approach of the permanent set of teeth, though hidden in their crypts in the maxillary bones, are natural excitants to action of that vital process by which the deciduous teeth are removed. Vitality as exhibited in the various functions being the curative power, medicines sustain to it the relation of artificial excitants or retardants. In cases of structural change physical obstructions to vital action may require physical or chemical power for their removal before the vital powers can accomplish their healthful results.

The action of excitants and stimuli is not to increase the amount of vitality in the organism, but to call from parts needing *less* than normal to parts needing *more* than normal that amount of vital force required to ward off disease.

The stimulus of a whip does not increase the strength of the horse. But under the influence of it he puts more than normal of his animal powers into his limbs. And in more instances than one he has been known to put all his vital force into his limbs, pull out his load, and lie down and die. *Ubi irritatio ibi fluxus* may be interpreted in harmony with our subject without doing violence to the text, thus—*where the excitant is, thither the vital forces tend.*

Again, vitality is a physical or mechanical force. The most common and perhaps the most interesting observations that can be made in nature are connected with vitality as a mechanical force. The human body is a machine—a piece of vitalized mechanism. We walk and talk and work only as a machine might do operated by chemical or any other force, if it but sustain the proper relation to the parts. The blood is forced mechanically through the arteries. Mastication is a mechanical process. Food is acted upon mechanically in the stomach as well as chemically. To us, as professional men, the most interesting of all the mechanical action of vitality is the forcing of the teeth from their crypts in the maxillary bones out through four integumentary membranes to their respective positions in the dental arch. When the natural processes do not harmoniously conspire to this result there is sometimes great resistance to the emergence of the teeth. It is often supposed that this mechanico-vital pressure of the teeth from beneath against the overlying integument of the gum is the cause of the intense pain sometimes experienced in dentition. It seems scarcely possible to me that such intense suffering and nervous derangement as to cause in some cases spasms and death, could be the result of pressure on nerves so slightly sensitive to touch as are the nerves that ramify the gum.

Let us remember the law of mechanics—that action and reaction are equal. However great the vital force expended in causing the teeth to emerge, if resisted, a reactionary force of equal pressure is expended in the opposite direction upon the highly sensitive pulp and upon the main trunk of the dental nerve. To this source, therefore, must we look for the intensity of the suffering and the alarming symptoms in such cases.

This mechanical action of vitality is more apparent, perhaps, in vegetable life. The seed put in the ground will expand not only by absorption of water, but by its own vital force. A seed having *lost* its germ of life will expand by mere absorption of water, but it will not crack its shell and the ground above it. In spring time we may observe the tenderest and most delicate little shoots lifting off the ground that lies heavily upon them and peering out. Look, then, at the force their roots must exert. They make their way downward into the more solid earth. The requirement of force in this direction is so great that some have supposed there must be an earth-solvent at the terminal point of each rootlet.

Growing vines and trees will sometimes thrust their roots into crevices of rocks and burst them asunder—and under stone walls, and tumble them down by mere force of vitality. A supplemental bud for which no provision seems to have been made in the previous season's growth will push its way out through the smooth tough bark of a tree.

One of the professors at Amherst College made an experimental test of the force of vitality in a growing squash. He confined it in an iron basket, which prevented growth and expansion, except in the upward direction. Above it he placed a strong bar, and wèighted the bar from time to time, as he found the previous weight lifted by the growing squash, till finally it lifted several hundred pounds, and broke the bar.

Who that considers the mechanical force of vitality as exhibited in this and other cases cited,—with its equivalent, the reactionary force,—can doubt the source and the extremity of the suffering that attends difficult and obstructed dentition?

Again, vitality adapts its action to changing circumstances. This in the animal kingdom we call instinct. Man exhibits this power of adaptation, both by instinct and by his reasoning faculty. We speak of his intellectual and his moral instincts. But whence originated those forms of words and phrases, *vital instinct* and *instinct with life?* These words are not commonly employed, especially the latter, with a definite and forceful meaning, but as a rhetorical metaphor. But have they not a definite and forceful meaning, derived from the consciousness we always have, but do not often formulate, that vitality, wherever found, exhibits instincts, that the vegetable as well as the animal kingdom is *instinct* with life?

When we see a fowl searching for a retired place to make her nest and hatch her young, we say that instinct is guiding her movements; and when, pressed with hunger, she goes in search of food, we say that instinct teaches her where food may be found, and the kind of food to select. Plants, also, go in search of food and drink. If they had legs they would walk off, as do the animals, to find it. If there be a fountain of water within reach of a growing plant, when its wants are not supplied by rains and dews it will send out its roots to the fountain.

Climbing vines will take a direction of growth towards anything that will serve as a support, not by any attractive power in the support for the vine, but by an instinctive turning of the vine towards the support. It will also reach out its tendrils to take hold of that support. I have heard of vines being so stupid as not to know how to climb without a little teaching.

Observe further the instinct of plants in obtaining food.

If a carcass be buried near a vine,—but beyond the present growth of its roots,—in the search for plant-food the vine will send out roots to the decomposing carcass for supplies. A network of rootlets will environ it and feed upon it.

If you put a chicken fresh from the shell on its back, it will right itself on its feet, in obedience to that instinct which says that it ought to go through the world on its feet. If you turn a leaf wrong side up, it will right itself as certainly, though not as expeditiously, as the chicken in obedience to that vital instinct which says it has the wrong face to the sun. This has sometimes been attributed to the attractive power of light.

If a slip be cut from the branch of a tree having buds, which, if the slip had not been cut from the tree, could only have produced leaves and twigs, the same slip put in the ground will develop roots and rootlets, with functions entirely different from the functions of the leaves. With the change of circumstances it changes the character of its growth. There is almost no end to the examples we may observe of the operations of the vital instincts of plants, animals, and men, and they lead us to the conclusion that instinct is everywhere associated with vitality.

We have another word, not a synonym of the word instinct, though used often to express nearly the same characteristic of vitality. We speak of vital *tendencies.* We say that vital action *tends* to such or such results. I have spoken of the vital instinct as an adaptation to changed circumstances and conditions. The signification of the two words will be made apparent by an example. The *tendency* of a tree is to grow vertically upward; but if that *tendency* is thwarted by an obstruction, its vital *instinct* will turn it aside till the obstruction is passed, when it will again resume its former tendencies toward the vertical position.

Vital *tendency* is far more commonly observable than that peculiar characteristic I have called *instinct.* It is the varying *tendency* in different organisms which constitutes the differences in organisms. While each combined whole has its peculiar type of development, each individual organ also has its *tendency* to a definite form. Growing side by side out of the same soil, subject to the same external influences, are two plants differing from each other in every perceivable aspect. These differences can be accounted for only by the varying tendencies of their organic life. Each stem, bud, leaf, flower, fruit, and seed, tends to its peculiar form of development. The same is as true in the human organism as in the plant organism. Each organ of the body has a tendency to a definite form and adjustment of all its parts. This tendency is nowhere more fully illustrated than in the development of the teeth and their arrangement in the dental arch.

From their very earliest fœtal development—in the papillary stage—the tendency toward a tooth form is apparent. In the saccular stage of development the tendency is much more apparent. Here the vital organism is more complete, and the pulpy, plastic mass is moulded, under the influence of the vitality that pervades it, into the form of the coronal face of the tooth preparatory to its calcareous hardening and fixedness of form. Histologists tell us that the different classes of teeth—incisors, cuspids, bicuspids, and molars—are distinguishable in the soft, pulpy state by this tendency of each to take on a typical form. If we examine the tooth-pulp just previous to the process of dentification, we may observe the tendency toward the tubular structure of the dentine in the linear arrangement of the formative cells. So also in the development of the enamel: the tendency to its peculiar structure is early seen in the lifting up of the membranous veil of the enamel organ above the coronal face of the dentine, and stretching between the two the whole cluster of gossamery sheaths, in which are deposited the lime-salts of the enamel-rods.

Observing this tendency in so many particulars, how shall we interpret such language as this coming from Dr. Charles Tomes, of London, published in the Cosmos for June, 1873? He says, in reference to the teeth, "There is, I believe, no such thing as a natural tendency toward the assumption of the regular form in the dental arch; the physical forces at work—namely, the lips and the tongue—are amply sufficient to account for all the phenomena observed; and explanations based upon such a tendency fall, like references to vital force as an explanation of physiological phenomena, into the category of mere forms of words calculated to cloak our real ignorance."

Much as I esteem Dr. Tomes for his talents and for his scholarly acquirements, I cannot refrain from expressing my surprise at language so meaningly spoken, yet so contradictory of the most observable facts of nature.

If in the structure of the dentine, in the arrangement of the enamel-rods, in the development of the roots and in the varying structure of the cementum that covers them, there is a tendency in every vital process toward a typical form, it would be strange, indeed, if that vital power which forces the teeth from their bony crypts in the maxillæ should not also tend to bring them to the elliptical line of the alveolar ridge. Is there no "*natural tendency*" to a definite form and articular arrangement in the framework of the human body? No "*natural tendency*" in the long bones to assume the cylindrical form? No natural tendency of the ribs to assume the flattened form, curvilinear extension, and an inclined arrangement at regular distances from each other? If this be so, what becomes of the science of anatomy? and on what is based paleontology? Both become impossible sciences; and any attempt at understanding the forms of the ancient life of the earth through the media of fossil remains is but a work of the imagination. Shapely parts and typical forms of organic bodies are only possible on the assumption of natural or vital tendencies.

Whatever force we may conceive it possible for the lips and the tongue to exert upon the crowns of the teeth, to bring them into line *after* their emergence from the gum, the *vital force tends* to this result from the start, *before* they have emerged from the gum. At this period it is impossible for lips or tongue to exert any physical or mechanical force upon them, for they are protected from external pressure by the bone-crypts in which their crowns are formed.

Who that has observed an anatomical specimen prepared from a subject of about five and a half years of age, when both sets of teeth are in the jaws, and seen the utter confusion in which the crowns of the permanent teeth are found, has not wondered at the operation of that *instinctive vital force* by which the teeth are brought out of this confusion to so complete and orderly arrangement as they have, even when the crowns first cut the gum? Having brought them thus near into line, the same force is abundantly adequate to complete the arrangement, except in cases where mechanical obstructions render it impossible.

I should not have deemed this point worthy of such extended remark, except in consideration of the distinguished source of the paragraph I have quoted, and that I have nowhere seen that it has been recalled or contradicted, except by indirection, in the able paper of Dr. M. S. Dean, read before you early in the year, which I had not seen till after the above had been written.

In this brief survey of the characteristics of vital force I have not attempted to canvass the whole subject; nor have I so amplified all the points of my paper as to make them entirely lucid. And I am free to confess that the abstruseness of my subject, much as I have thought upon it, has, in some of its aspects, baffled my maturest conceptions. Some of the points presented may be new to some of you. They were so to me; and as they burst freshly upon my mind, their inceptive newness led me to hesitate, at first, to offer them for your consideration. But, reflecting further, I concluded to make this society of scientific, thoughtful workers the crucible into which I would put my crude thoughts; and if, in passing through the heat of discussion, a residuum should be obtained of any fact or principle, as a gain to science, both you and I would be gainers thereby, and not have occasion to regret that we were fellow-helpers to the truth.

Dr. W. H. Atkinson. I am both glad and sorry when such a paper as that is read before us. Glad that the subject has been broached; sorry that it has been so fragmentarily presented, with such wide gaps between the statements and the verification of the statements, which renders it almost valueless to any but one who is in advance of the writer. It is in some sort a presentment of that which is familiar to all thinkers under a new set of nominations. It is an effort to reconcile the irreconcilable and conclude the inconcludable. What he terms vital force, if properly nominated, would be quite intelligible to us. We would use another term—typal force, or exercise of typal energy; but when he asserts that there is living and dead matter he is quite in error. There can be nothing that has existence which is absolutely dead, for "absolutely dead" is an absolute negation of entity. Tyndall himself said that when you have pushed matter to this last analysis you find what he has nominated vital force or energy, what the writer calls vital instinct.

Now, whether it is instinct or extinct, it makes no difference as absolute firsts, but he speaks here of categories that could be nominated as anywhere from a second to a tenth in the series, and still nominates it as firsts. When you speak of firsts you speak of atoms, of principles, of entities. You speak of something which has infinity of duration in existence.

Atoms never are made. Laws abide,—simply are,—and when the latent affinities resident in atoms are awakened, they combine in the different proportions in which we find them in the compounds around us. That which is the summation of all the rest—which expresses the value of all the gatherings together and goings apart that have made their way from atoms through the mineral, vegetable, and animal kingdoms, up to man, the divinest protoplasm—is in the brain itself.

And the affinities which pervade matter, and which give it its manifold expression and variety, are from the presence of the creative agency, and without that presence there could be no affinity. If you make out that spirit and matter are distinct, you destroy the basis upon which living structure is produced. The writer of the paper takes no cognizance of the fact, that when being is dropped from one plane, or raised to another, it is by a different combination of the same elements. How do rocks die? You know we get our kaolin and other products of that kind from that which was feldspar, through its disintegration, but that is not dead matter only so far as the mode of life was concerned. Where is the point here? The point is this: All things live by a reduction of some other mode of individual existence, or organic presence; that is to say, something must die that something else may live, throughout the whole range of the feeding process, and the feeding process holds good, from star-dust to the finest interchange of thought and affection in the brain of mankind. In the assertions of the paper he does grasp the principle, but he forgets the category.

Just as soon as we cease to make pabulum we cease to live. We always live on embryonal globules, and our mode of nourishment is never essentially changed.

All things are in themselves but aggregations of atoms, endowed with certain affinities, and limited according to an inherited type, and, deny it who may, that type holds good in a tooth.

Death has been defined as life; that is to say, we only live by the destruction of ourselves. In other words, we are autophagous, self-eaters, and that is true by way of accommodation; but there is a distinction here which we feel, although it lies too deep for verbal definition. There is an endless scope to this question, but I have probably said as much as is profitable to say upon this occasion.

Adjourned.

BALTIMORE COLLEGE OF DENTAL SURGERY.*

The thirty-seventh annual commencement of the Baltimore College of Dental Surgery was held in the Academy of Music, Friday evening, March 9th, 1877.

An address was delivered by George Homer Bowman, of the graduating class; the valedictory by William H. Dwinelle, M.D., D.D.S., New York.

The number of matriculates for the session was forty-six.

The degree of D.D.S. was conferred on the following members of the graduating class by Prof. F. J. S. Gorgas, Dean:

NAME.	RESIDENCE.	THESIS.
Pauline Boeck	Germany	Caries of the Teeth.
George Homer Bowman	Virginia	The Dental Pulp and its Diseases.
Thomas Washington Crozier	Virginia	Extraction of Teeth.
Elias Drayton Earle	Florida	Operative Dentistry.
Hammett Xavier Gale	Ohio	The Art of Applying Artificial Teeth.
Walter S. Harban	Maryland	The Effects of Diseased Teeth on the System.
Sandy Stuart Harris	Virginia	Caries of the Teeth.
Robert Yates Henley, Jr.	Virginia	First Dentition.
Thomas Huggins	England	The Fifth Pair of Nerves.
Frederick Koerner	Maryland	Nitrous Oxide Gas.
Benjamin Lanier Lane	Georgia	Circulation of the Blood.
John E. La Motte	Maryland	Dental Caries.
Luke Johnson Pearce	Maryland	Dental Surgery.
Charles H. Reynolds, L.D.S.	Canada	Morbid Effects of Dentition.
James Matthews Roberts	Maryland	Dental Development.
James Edwin Shreeve	Maryland	Comparative Anatomy of the Teeth.
Henry Singruen	Germany	Odontalgia.
Alonzo Stouch	Pennsylvania	Characteristics of the Teeth.
Marion William Williams	Tennessee	Dental Hygiene.

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* We present in this issue reports of seven dental colleges. We have not yet received that of the Ohio College, whose commencement took place March 7th. The commencement of the dental department of Michigan University will be held on the 28th inst.; that of the dental department of Harvard University does not take place until June.—Editor Dental Cosmos.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE twenty-first annual commencement of the Pennsylvania College of Dental Surgery was held at the Academy of Music, Philadelphia, Wednesday evening, February 28th, 1877.

The address to the graduates was delivered by Prof. T. L. Buckingham, D.D.S.; the valedictory by Dr. Josiah W. Way.

The number of matriculates for the session was one hundred and twenty-nine.

The degree of D.D.S. was conferred upon the following members of the graduating class:

NAME.	RESIDENCE.	THESIS.
John W. Adams	Pennsylvania	Separating Teeth.
E. J. Baird	Pennsylvania	Odontalgia.
A. H. Bennett	Pennsylvania	Ancient Dentistry.
J. W. Boisol	Pennsylvania	Separating Teeth.
C. A. Buxton	Massachusetts	The Circulatory Organs.
J. F. Deacon	New Jersey	Hemorrhage.
Philip T. Dedman	Kentucky	The Maxillary Sinus and its Diseases.
Leopold De Puy	Pennsylvania	The Dentes Sapientiæ.
W. H. Dickinson	Pennsylvania	Dental Caries.
J. Warren Durnall	Pennsylvania	Artificial Respiration.
Luis Rey y Dominguez	Cuba	Periodontitis.
Wm. L. Green, Jr.		The Preservation of the Teeth.
B. W. Haines	New Jersey	Prosthetic Dentistry.
Wm. H. Hall	Illinois	Creasote.
C. S. Hanks	Pennsylvania	Odontalgia.
H. W. Herman	Missouri	Development of the Teeth.
E. A. Hertz	Pennsylvania	Digestion.
M. C. Hitchcock	Connecticut	The Maxillary Sinus and its Diseases.
R. E. Hans Von Hertzberg	Germany	Nitrous Oxide as an Anæsthetic.
E. J. Kilmer	Pennsylvania	Operative Dentistry.
Jos. L. Mann	Pennsylvania	Arsenic and its Uses.
J. C. Nisley	Pennsylvania	Inflammation.
Juan R. Ortiz	C. A.	Death.
A. R. Perkins	New Jersey	Peculiarities of the Teeth.
J. W. Reed	Missouri	The Abuse of Anæsthetics in Dental Practice.
W. P. Richardson	Virginia	The Dental Pulp.
C. G. Ross	Indiana	Anæsthetics.
Alejandro Salcedo	U. S. of C.	Alveolar Abscess.
C. S. W. Schomo	Pennsylvania	Deposits in the Mouth.
A. T. Smith	Minnesota	Facial Neuralgia.
N. O. Thompson	Missouri	Sensitive Dentine.
J. W. Way	Pennsylvania	Inflammation.
H. W. Wass	Pennsylvania	Periodontitis.
J. B. Watt	Pennsylvania	Impressions and Dental Substitutes.
Juan N. Ynchausti		Salivary Calculus.

The honorary degree was conferred on James Truman, D.D.S., Germany, and C. S. Beck, M.D., Wilkesbarre, Pa.

PHILADELPHIA DENTAL COLLEGE.

The fourteenth annual commencement of the Philadelphia Dental College was held at the Academy of Music, Philadelphia, Tuesday evening, February 27th, 1877.

The address to the graduates was delivered by Prof. T. C. Stellwagen, M.D., D.D.S.; the valedictory by Hibbert Woodbury, D.D.S.

The number of matriculates for the session was one hundred and forty-five.

The degree of D.D.S. was conferred on the following graduates:

NAME.	RESIDENCE.	THESIS.
I. H. Alexander	South Carolina	Gold as a Filling.
Charles L. Anderson	Massachusetts	Treatment of Children's Teeth.
Cornelius J. Andruss	New York	Blood, and Organs of Circulation.
Silas J. Baird	Ohio	Dental Pathology.
Everett M. Baker	New York	The Duty of a Dentist.
Clive R. DaC. Belisario	Australia	Mastication.
Frank W. Bliss	Illinois	Dental Education.
Frank H. Brimmer	Maine	Salivary Calculus.
Robert K. Bryan	Kentucky	The Extraction of Teeth.
John R. Callahan	Ohio	The File in Operative Dentistry.
Edward P. Castel	Brazil	Dental Caries.
Charles D. Cheney	New York	The Dental Student.
Firman W. Clawson	Michigan	Digestion.
Thomas G. Cowardin	Virginia	Filling Teeth.
Charles A. Davis	Pennsylvania	Air-Germs and Spontaneous Generation: their Bearing on the Production of Contagious Diseases.
Charles E. Diehl	Pennsylvania	Nursery Deformities.
George F. Eames	Maine	Hemorrhage.
L. Ashley Faught	Georgia	The Spinal Cord.
P. Lafayette Foote	New York	Dentition.
Edmundo R. Futsc	Cuba	Digestion.
Charles E. Graves	New York	Continuous Gum.
Georges Giraud	France	Epithelioma of the Mouth.
Henry W. Griffiths	England	Bone.
Jose M. Gonzalez	Cuba	Treatment of Inflammation.
Frank A. Hawes	New York	Alveolar Abscess.
Samuel E. Haines	Pennsylvania	The Dental Arteries.
Harrison L. Hiltner	Pennsylvania	Continuous Gum and Plate Work.
William Hopkins	England	Modifying Effect of Mastication on Digestion.
Vincent A. Kaltenbrun	Kentucky	Materials for and Methods of Filling.
Samuel M. Kelley	Ohio	Dental Caries.
George Kirchner	Germany	Digestion.
Emil E. Klingelhoefer	Prussia	Diseases of the Mucous Membrane of the Mouth.
Carl Kniewel	Germany	Gold in Mechanical Dentistry.
Harry K. Leech	Pennsylvania	Treatment of Hemorrhage in the Oral Cavity from Surgical Operations or Traumatic Lesions.
J. Loma McGregor	New Hampshire	Nitrous Oxide.
H. Stewart McKyes	Canada	Hygienic Principles.
Daniel Neall McQuillen	Pennsylvania	Digestion.

NAME.	RESIDENCE.	THESIS.
George H. McMichael	Canada	Salivary Calculus.
Henry F. Marshall	Rhode Island	Ether and Chloroform.
Charles S. Mathews	Ohio	Changes of Food in the Alimentary Canal.
Davis N. Merrill	Maine	The Coming Dentist.
Fred P. Moore	New York	The Teeth, their Functions and Importance.
Thomas L. Nicklin	Oregon	Sensitive Dentine.
William P. O'Neill, M.D.	South Carolina	Secondary Syphilis.
Jesus Martinez Ordonez	Colombia, S. A.	Causas de Caries Dentales.
Mellville Quinby	England	Alveolar Abscess.
Ambrose Richter	Austria	Fistula.
Frederick A. Reinhardt	Pennsylvania	Odontalgia, Causes and Cures.
Adolphe N. Roussel	New York	The Dangers of Dental Operations.
James G. Sinclair, L.D.S.	Canada	Food in Relation to the Teeth.
Charles M. Sharp	New York	Obtaining Impressions of the Mouth.
Olin H. Smith	Illinois	Cavum Oris Humani.
Jesse R. Townsend	Kansas	The Teeth and their Extraction.
C. L. Vaughan	Michigan	Traumatic Hemorrhage.
William J. Verge	Nova Scotia	Exposed Pulps.
Jos. R. C. Ward	Pennsylvania	Neuralgia: its Relation to Dental Irritation.
Claison S. Wardwell	Connecticut	Restoration of Contour.
Clark N. Webster	Michigan	Proximate Cavities in Superior Biscupids, and their Treatment.
James B. Weiler	Pennsylvania	Operative Dentistry.
E. Wayne Whitlock	Illinois	Odontonecrosis.
Washington G. Winter	California	Dental Education.
James L. Withrow	Pennsylvania	Exposed Pulp.
Hibbert Woodbury	New York	Orthodontia.
Max Wunder	Saxony	Accidents caused by the Extraction of Teeth.
Thomas G. Wonderly	Illinois	The Mouth.
Horace S. Young	Pennsylvania	Human Temperaments and their Relation to Dentistry.
R. Campbell Young	South Carolina	Operative Dentistry.

MISSOURI DENTAL COLLEGE.

The eleventh annual commencement of the Missouri Dental College was held in Mercantile Library Hall, St. Louis, Wednesday evening, March 7th, 1877.

The valedictory address was delivered by Prof. J. S. B. Alleyne.

The degree of D.D.S. was conferred upon the following graduates by Prof. W. H. Eames:

NAMES.	RESIDENCE.	THESIS.
J. G. Harper	Missouri	Dental Materia Medica.
R. H. McNutt	Tennessee	Operative Dentistry.
D. J. McMillen	Missouri	Cylinder Fillings.
A. S. Prince	Missouri	Development of the Teeth.
A. J. Prosser	Missouri	Mechanical Dentistry.

NEW YORK COLLEGE OF DENTISTRY.

The eleventh annual commencement of the New York College of Dentistry was held at Chickering Hall, Tuesday evening, February 27th, 1877.

The Faculty prize was awarded to James R. Boyd, D.D.S.

The address to the graduates was delivered by Prof. Frank Abbott, M.D., and the valedictory by George S. H. Comins, D.D.S.

The *written examination* in this college takes the place of a thesis.

The number of matriculates during the past year is eighty-two.

The degree of D.D.S. was conferred by Dr. Wm. H. Allen, President of the Board of Trustees, upon the following-named gentlemen:

NAME.	RESIDENCE.
George P. Bliven	Brooklyn, N. Y.
James R. Boyd	Natchez, Miss.
George S. H. Comins	Ewing, Mass.
Curtis S. Chittenden	Hamilton, Ontario, Ca.
Edward T. Dobbs	Winona, Minn.
Frank H. French	Great Barrington, Mass.
John Gordon	New York City.
George Haskins	Newark, N. J.
James H. Hoag	Yonkers, N. Y.
George S. Kendall	Ridgefield, Conn.
George H. Newbery	
Wm. F. Thompson, M.D., D.D.S	San Francisco, Cal.
Fred. G. Wilkes	New York City.

MARYLAND DENTAL COLLEGE.

The fourth annual commencement of the Maryland Dental College was held in the Academy of Music, Baltimore, Thursday evening, March 1st, 1877.

The address to the class was delivered by Dr. Jesse C. Green; the valedictory by A. W. Ross.

The degree of D.D.S. was conferred upon the following graduates:

NAME.	RESIDENCE.
Preston A. Ames	Maryland.
B. F. Barclay	Pennsylvania.
John D. Clark	North Carolina.
H. Olie Duerson	Virginia.
George D. Fouke	Maryland.
Civileon Fones	Connecticut.
Henry A. Gaylord	Massachusetts.
P. L. Hull	New York.
Ernest F. King	Maryland.
A. P. Krouse	Maryland.
Wm. B. Mann	Maryland.
George S. Meigs	New York.
Chas. J. Peterson	Iowa.
Frank H. Paign	New York.
A. W. Ross	South Carolina.
J. B. L. Swentzell	Maryland.
J. B. Thresher	Connecticut.

BOSTON DENTAL COLLEGE.

The ninth annual commencement of the Boston Dental College was held at Fraternity Hall, Boston, Wednesday evening, March 7th, 1877.

Essays were read by Henry Alonzo Wells, Benjamin Varnum Howe, and George Oliver Tuck.

The valedictory was delivered by Francis Howard Chidester, D.D.S., and an address by Prof. Elisha Chenery.

The number of matriculates for the session was thirty-two.

The degree of D.D.S. was conferred on the following graduates by Prof. Isaac J. Wetherbee, President:

NAME.	RESIDENCE.	THESIS.
Frank Pierce Abbott	Maine	Artificial Dentures.
George Frederick Booth	New Hampshire	Artificial Dentures.
Francis Howard Chidester	Ohio	Caries of the Teeth.
Chauncey Waters Clement	New Hampshire	Operative Dentistry.
John Cheever Danforth	Massachusetts	Anæsthetics.
Daniel Ward Edgerly	New Hampshire	Vital Force.
*Horatio Pillsbury Fernald	Massachusetts	Celluloid.
*Homer Lane Fitts	Massachusetts	Odontalgia.
Benjamin Varnum Howe	Massachusetts	The Teeth: their Importance and Care.
Napoleon Hybennet	Massachusetts	Gold Plate.
*Walter Augustus Haynes	Massachusetts	Digestion.
*Edgar Osgood Kinsman	Massachusetts	Phosphor-Necrosis.
William Edson Marden	New Hampshire	Distribution of the Trifacial.
Charles Willard Partridge	Massachusetts	Digestion.
*Dana Baldwin Pratt	Massachusetts	Salivary Calculus.
Edward Osgood Richards	Massachusetts	Extraction of Teeth.
Stephen Gifford Stevens	Massachusetts	Deciduous Teeth.
George Oliver Tuck	Massachusetts	Progress of the Dental Art.
Henry Alonzo Wells	Massachusetts	Anæsthesia.
John Edward Whitmore	Maine	Circulation of the Blood.
George Almon Young	New Hampshire	Diagnosis.
Levi Zimmerman	Pennsylvania	Pivot Teeth.

* Diplomas conferred when term of pupilage is complete.

ALUMNI ASSOCIATION OF THE MARYLAND DENTAL COLLEGE.

At the annual meeting of the Alumni of the Maryland Dental College, the following officers were elected for the ensuing year:

President.—Dr. F. A. Levy, of New York.

Vice-President.—Dr. A. W. Ross, of South Carolina.

Recording Secretary.—Dr. C. E. Busey, of Maryland.

Corresponding Secretary.—Dr. H. O. Duerson, of Virginia.

Treasurer.—Dr. C. M. Gingrich, of Maryland.

EDITORIAL.

DEFERRED MATTER.

A PAPER read by Prof. Geo. T. Barker before the Pennsylvania Association of Dental Surgeons upon the "Abuse of Nitrous Oxide," and the discussion which followed, are in type, and laid over for want of space until the next number. Other articles of interest we have also been compelled to defer for the same reason.

AN ACT TO REGULATE THE PRACTICE OF DENTISTRY IN THE STATE OF WEST VIRGINIA.

THE following is the text of a bill to regulate the practice of dentistry in West Virginia, which has become a law in operation in that State. The bill was drafted, and its passage secured, chiefly, we are informed, through the exertions of Dr. Charles H. Bartlett, of Parkersburg.

An Act to regulate the practice of dentistry, and protect the people against empiricism in relation thereto in the State of West Virginia.

Be it enacted by the Legislature of the State of West Virginia now met and sitting in general assembly, and by the authority of the same:

SECTION 1. That from and after the passage of this act it shall be unlawful for any person or persons to engage in the practice of dentistry for compensation in the State of West Virginia, unless said person or persons shall have received a diploma from the faculty of some dental college duly incorporated under the laws of this or some other State of the United States or foreign government, in which is annually delivered in good faith a full course of lectures and instruction in dentistry, or shall have obtained a license from a board of dentists, duly authorized and appointed by act of this or some other State of the United States to issue such license.

SECT. 2. That any person or persons who shall in violation of this act practice dentistry in the State of West Virginia for compensation shall be liable to indictment, and on conviction shall be fined not less than fifty nor more than two hundred dollars for each offense. *Provided*, That nothing in this act shall be so construed as to prevent any person or persons from extracting teeth, or in any manner interfere with any person or persons who are at the present time engaged in the regular practice of dentistry in the State of West Virginia.

SECT. 3. That all fines imposed and collected under the provisions of this act shall be paid into the treasury of the county where such conviction shall take place, for the use of common schools in such county.

PERSONAL.

J. Osbourn Edwards, D.D.S., New York, 1876; M.O.S., London, 1872, was examined (by the Faculty of Medicine, Batavia, Java, under the law of June 10th, 1876, No. 139, for the regulation of Dental Surgery) on November 27th, 28th, and 29th, and received the diploma conferring the degree "Tandkeelkundige."

The examination was written, the general subjects being Anatomy, Surgery, and Physiology; the special subjects, Dental Medicine, Pathology, Surgery, and Mechanics.

OBITUARY.

DR. J. J. ANDERSON.

Died, suddenly, at Springfield, Mass., March 8th, 1877, of apoplexy, Dr. J. J. Anderson, aged 45 years.

Dr. Anderson was a graduate of the Philadelphia Dental College. He was highly esteemed as a man and an operator.

BIBLIOGRAPHICAL.

A Practical Treatise on Operative Dentistry. By J. Taft, Professor of Operative Dentistry and Dental Hygiene in the Ohio College of Dental Surgery, etc. Third edition, with one hundred and twenty-eight illustrations. Philadelphia: Lindsay & Blakiston, 1877.

It is about eighteen years since the first publication of this work. After a lapse of nine years a second edition was issued, and now, another nine years later, a third is before us, a substantial volume of 520 pages, on good paper, in large type, and with liberal margins.

The general plan of the work, we are told, has not been modified; but an effort has been made, almost equivalent to the writing of a new volume, to adapt it to the present advanced state of the science of dentistry.

We should be glad, indeed, if we could pronounce the effort a success; if we could say that in our judgment the volume contains a satisfactory exposition of the principles and practice of modern dentistry. It is matter for regret that a large discount must needs be made. In many important respects it falls very short of the expectations which we had indulged regarding it. Not that the volume may not be read with interest and instruction by students, and by many, perhaps most, practitioners, but that so much of its teaching is elementary, imperfect, and insufficient in direction and detail, that it contains so many errors in style and statement, and so much that is loose and vague in description. For instance, the floor of the antrum is said in certain cases to be "absorbed *away*." Nervous affections from exostosis are said to be caused by "pressure upon the *pulp*." The phrase *dead tooth* is employed to express the condition of a tooth whose pulp has been devitalized. The *alveolus* is said to become diseased, to die, and to exfoliate. A vacuum above the pulp is said to be objectionable. Query,—how could it be obtained?

The subjects of tartar, irregularity, atrophy, exostosis, denuding (denudation), chemical abrasion, and necrosis, are compressed into a single introductory chapter. It is scarcely worth while to say more of the treatment of these several topics than that they are all disposed of in twenty-six pages. They cannot be said to be discussed, scarcely defined. The instruments illustrated for the removal of tartar are clumsy and antiquated, and not a word is said relating to the process which is attracting so much attention, of removing tartar from the roots of loose teeth, and their subsequent restoration to usefulness. The subject of irregularity of the teeth is afforded but two pages, though there is scarcely any other topic which is or should be more interesting to the dentist. The correspondence of chronic tonsillitis with the narrow or contracted arch is so general, and other conditions accompanying irregularities of the teeth are of so much interest and importance, that a much fuller treatment of the subject seems to be demanded in a text-book of operative dentistry. No rules are given for the diagnosis of exostosis, nor are the principles of treatment indicated. Denuding (*sic*), chemical abrasion, and cupping have their origin, we are informed, in the constitution, are not merely local, and may be arrested chiefly by constitutional treatment.

The chapter on dental caries contains much equivocal teaching, and omits much that might well have been incorporated; as, for instance, a reference, at least, to what are termed parasitic causes. The investigations of Leber and Rottenstein in this direction were surely worthy of mention.

The chapters on materials for filling, instruments for filling, and on separation of the teeth, we will pass without special criticism. The chapters on filling teeth, and classification of cavities, including filling by classes and modifications, are good, very good,—nay, in most respects, admirable. The objection urged to the use of gold and tin in the same cavity is at variance with the experience of some of our best operators, who place plates of tin-foil on the cervical walls of cavities, and pack gold, side by side, upon it, with satisfactory results. A repetition of the stale remark, that "a tooth that can be filled at all can be filled with gold," might as well have been omitted. The criticisms on amalgam are not, we think, warranted by the facts. In the consideration of the treatment of sensitive dentine (which, our author still insists, is an inflammatory condition), we are glad to see that he pronounces against arsenic altogether for that purpose. It seems a little strange that, in this connection, he makes no reference to the necessity of perfect dryness of the cavity in the operation of excavating, to the employment of electricity, to the use of a hot burnisher, to the advantage of rapid cutting, or to the *lifting* cut so highly commended by some operators. In the section on filling pulp-canals no reference is made to the use of cotton as a filling material. though it is highly esteemed for this purpose by many operators.

We have not space to devote to further criticism of this character, but will say that, as a rule, the mechanical aspects of the various topics are presented with good judgment, and we heartily commend the volume to practitioners and students of the manipulative part of the dentist's vocation. Notwithstanding its defects, this volume is unquestionably superior in the respect alluded to to any other which has been placed before the profession.

AN ANATOMICAL DESCRIPTION OF THE PERMANENT TEETH. By H. JUDD, M.D., D.D.S.

This little brochure was written, as we are informed in the preface, at the request of the St. Louis Dental Society. It is a concise description of the characteristics of the permanent teeth of man, including a nomenclature of many important points,—fissures, sulci, fossæ, ridges, etc.,—hitherto without distinguishing names.

A somewhat careful reading of the pamphlet suggests but a single criticism. The little projections of the coronal extremity of the pulp Dr. Judd terms "their flattened ligaments,—*ligamentum suspensorium pulpæ*,"—and describes them as serving to retain the pulp steadily in place. It is true that these projections are more dense in structure than other portions of the pulp, but they probably do not hold more firmly to the calcified tissue than do the other lateral surfaces of this organ. They are more dense because having passed through their progressive stages of development up to a readiness to be impregnated with the lime salts and to be transformed into dentine. The term used, however, describes an anatomical appearance if not an anatomical fact. An adoption of the nomenclature of this little book will very much facilitate description, and we should be glad if a copy were in the hand of every speaker and writer on dental topics.

It is sold for the benefit of the St. Louis Dental Society, by G. A. Bowman, 2731 Olive Street, St. Louis, at twenty-five cents (postpaid) per copy, or twenty copies (postpaid) for four dollars.

JOHNSON'S NEW UNIVERSAL CYCLOPÆDIA. VOL. I. New York: A. J. Johnson & Son.

This magnificent volume of 1700 pages is a marvel of compactness, fullness, and precision. Orderly and systematic in its comprehensiveness and universal in its range, it is indeed a "treasury of useful knowledge," containing concise and accurate information upon almost every subject within the field of human knowledge. Its science articles especially commend it to students, writers, and professional men. Its convenient form and unequaled cheapness must secure it a place upon the library table of every one who can afford its price. It is unquestionably superior in very many respects to any other encyclopædia published.

THE MICROSCOPIST.—A MANUAL OF MICROSCOPY AND COMPENDIUM OF THE MICROSCOPIC SCIENCES, MICRO-MINERALOGY, MICRO-CHEMISTRY, BIOLOGY, HISTOLOGY, AND PATHOLOGICAL HISTOLOGY. Third edition, re-written and greatly enlarged, with 205 illustrations. By J. H. WYTHE, A.M., M.D., Professor of Microscopy and Biology in the Medical College of the Pacific, San Francisco. Philadelphia: Lindsay & Blakiston, 1877.

This valuable work, long known to and prized by microscopists in the embryonic form of its earlier issues, comes to us now in a much enlarged and improved third edition, the result of twenty-five years of development towards the highest type of perfection.

The book opens with a brief chapter on the history and importance of microscopy, which is followed by about sixty pages devoted to an account of the microscope, its accessories, its use, and the mounting, etc., of objects. Twenty-four pages then describe its applications to Mineralogy and Geology; seventeen to Chemistry, including full directions for the employment of the micro-spectroscope; eleven to Biology; twenty-nine to Vegetable Histology and Botany; twenty-four to Zoology; forty-four to Animal Histology; and nineteen to Practical Medicine and Pathology. Of these departments, that on Animal Histology is, as we might anticipate from the distinguished author's position and reputation in the scientific world, much the most complete, giving in a small compass instructions which, if faithfully followed out by the student, will leave little but details of third and fourth-rate importance to be gleaned from the larger work of Frey or the exhaustive manual of Stricker. The section on Pathology comprises a very faithful epitome of Rindfleisch's Pathological Histology, Part I.; but the good yet meagre account of the use of the microscope in practical medicine dismisses the pre-eminently important subjects of tube-casts in Bright's disease, and elastic tissue in the sputum of phthisis, in scarcely more than twice the space respectively that is devoted to considering the practically trifling deposit of cystine in cystinuria.

Thanks to the generous liberality of the well-known medical book publishers, Messrs. Lindsay & Blakiston, the work is enriched with a profusion of excellent illustrations printed in colors upon tinted paper in the highest style of the art. These engravings, which, when thus admirably executed, constitute the true wealth of a manual on the microscope, more than supply the place of volumes of description respecting the appearances presented to the eyes of students, and among them our readers will especially value the beautiful view of the development of enamel, Fig. 144, and the equally fine delineation of the structure of teeth, bone, cartilage, etc., Plate XX.

Finding as we do so much to admire and praise in this volume, we feel sure that our readers will sympathize with us in regretting that a few errors should have crept in to mar its completeness. We doubt not, however, that in the short time which will probably elapse before a fourth edition is called for, Prof. Wythe will have learned that the dots on Pleurosigma angul are not *hexagonal* (p. 58) but *circular;* that Nobert's 19th band is no longer "a matter of faith rather than sight" (p. 56), having been demonstrated and photographed by Colonel J. J. Woodward, of the Surgeon-General's office, several years since, and subsequently seen by many other observers; and that the admirable glass stage copied by Nachet and others was not "invented by Dr. Keen" (p. 30), but by our ingenious Philadelphia optician, Mr. Zentmayer himself.

J. G. R.

PERISCOPE.

A Singular Case of Facial Neuralgia.—Mrs. R. presented herself at my office during the early part of the fall of last year, October 10th, with neuralgia of the facial nerve, scarcely any portion of the right side of the face being free from pain. She had the whole of the lower molar teeth extracted, in hopes of obtaining relief, yet it only produced a temporary cessation of pain. She had taken, she asserted, many preparations, but none gave her a moment's freedom from pain, and she hoped I would prescribe something to produce sleep. I gave the following mixture and application:

℞.—Chloral hydrat. (Schœning), ʒi;
Sodii bromidi, ʒiij;
Syr. zingiberis, fl℥j;
Aquæ, ad. fl℥iv.—M.

Take two teaspoonfuls every hour, if in pain.

℞.—Fluid ext. aconit. rad., fl℥ss;
Tinct. opii,
Tinct. belladon.,
Chloroform., āā fl℥j.—M.

Paint the face as directed.

As she resided some distance away from my office, she was requested to report in two days if not better. She returned on the 12th inst., and reported herself worse than ever, and with a large substance under her tongue; upon examination, I found an abscess pointing over the cavity, where the first molar had been extracted, and which I immediately opened; a quantity of fetid, dark-colored pus was discharged, and with it the accompanying substance. The pain in her face instantly ceased, and from that time till the present she has had no return of her neuralgia. I forward the concretion to your office, in hopes you may be able to inform your readers and myself of what it is composed; my impression is that its continued pressure upon some portion of the dental nerve produced the fearful neuralgic pains from which the patient suffered. Respectfully yours, C. C. Cranmer, M.D., *Saratoga, N. Y.*

[The substance is apparently a salivary calculus, somewhat pointed, which, by an ulcerative process, had reached an unusual position.—Ed. Rep.]—*Medical and Surgical Reporter.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

To whom it may concern.—Alum is not a useful ingredient in tooth-powders, a recent dental journal to the contrary notwithstanding.

Charcoal is not a good dentifrice, though a public audience have recently been told by a dental orator that it is.

It is not dignified at a dental supper—or anywhere else—to pun on stumps, tusks, gums, snags, etc.

It is time that the employment of chloroform as an anæsthetic in minor operations was discontinued.

It is high time that an example be made by suit for malpractice for the discoloration of a tooth from the use of arsenic to obtund sensibility.

It is no longer necessary when an allusion is made to creasote to explain whence it is obtained, or to give its general uses in medicine.

The profession should have learned by this time that a dentist ought to keep his hands and instruments clean, and ought to be a gentleman. The statement to this effect need not be made a part of installation addresses for a little while to come.

Enough has been said and not enough done about the elevation of the dental profession.

It is time that writers for dental journals took more pains to *condense* what they have to say. Many good ideas are buried and lost under a mass of needless words.

It is time that secretaries of dental societies had learned that when a man talks without saying anything, it is not worth while to report him.

The allusions in the Bible to the teeth might be allowed to rest awhile.

Querists ought not to ask *elementary* questions. One who does not know how to treat alveolar abscess ought not to call himself a dentist.

Essays made up from the text-books do not usually add materially to the reputation of the compiler.—O. I. C.

CAN syphilis be conveyed through the media of dental instruments?—V. E. N.

I HAVE under my care a case of periodic neuralgia situate in the left temporal region, alternating between that seat and the neck. Will some one help me toward a diagnosis?—C. O. B.

CAN a constant ringing in the ear have its cause in unhealthy teeth?—JERSEY.

THE other day my attention was called to a tumor, evidently a cyst, quite the size of the largest orange, which had disparted the walls of the lower jaw; pricking the sac with a delicate bistoury, the blood jetted forth per saltum, and was only checked after a long-continued pressure. What was the nature of the growth?—TOULON.

I WOULD be glad if some member of the profession would give not merely the treatment, but the *principles* of treatment, for periodontitis, and thus oblige A YOUNG PRACTITIONER.

A MOLAR or bicuspid abscessed from putrescent pulp, *without* fistulous opening, but with discharge through pulp-canal into the cavity of the tooth. What is the most approved method of treatment?—R. J. H.

I AM unable to make a success with oxychloride of zinc in any form except in teeth or roots where the pulp has been removed. In every case, with live teeth, I have been unable to put in a temporary filling on account of the violent pain caused. I find the same trouble in trying to cap pulps with it, whether fully exposed or not. After seeing patients suffer the most unendurable pain for ten or fifteen minutes, I have been obliged to remove the torturing substance and resort to other means to accomplish my purpose. Will some one who has had more experience with this substance please explain how I can make a successful use of it?—DIX.

I WOULD call the attention of the readers of "Hints and Queries" to the following case, and thankfully receive any suggestions bearing upon it or its treatment:

"M" came to my office desiring that a discolored superior left central incisor be whitened to shade of adjacent teeth. Death of the pulp had been caused by a blow some twelve years before. There was a fistulous opening from the apex of the root. The tooth was free from caries. There had been no pain or soreness for years. I drilled through the palatal wall and found the canal wet. I thoroughly removed all discolored material both from the root and crown, and filled the apicial foramen. After some futile efforts to bleach, I inserted an oxychloride of zinc filling.

What is the dark material in such a canal? Can such a tooth be whitened?—J. M.

WILL some dentist who is now using celluloid state whether or not patients complain, soon after the insertion of the denture, of a disagreeable sensation being produced, either on the mucous membrane of the mouth or upon the stomach, supposed to be due to the camphor contained in the celluloid? Also, if salivation has been induced in any case by wearing a celluloid plate? I have had a case of this sort recently in my practice. If those who can speak from experience will give a remedy, or recommend something which will neutralize the camphor odor or taste previous to the plates being worn, they will confer a great favor on me. —D. E. C.

ABOUT a year ago a man came to my office and got a full upper set of teeth mounted on rubber. A short time ago he came in and said he could not wear his plate except while masticating, as it was nauseating to him. I made an examination of the plate and found it did not run back on to the soft palate at all. It is a light thin plate, fits to perfection, and gives him splendid satisfaction while masticating. When he sits down to his meals he prepares his victuals and then puts in his teeeh. If he were to put them in previous to sitting down he would be compelled to lay them out before he could get his victuals prepared. I think the trouble is all from nervousness, as I can find no other cause. Will some one please explain?—MECHANICAL DENTIST.

WILL some one please give a reason for the soaking of a cavity with creasote, as practiced by many dentists, before introducing a filling?—CREASOTE.

WILL some one of experience please tell what means are found most satisfactory to allay the excitability afflicting so many patients after a few hours spent in the dentist's chair?—NERVES.

HOT water has been recommended as an excellent remedy for the control of hemorrhage. Will some one tell how it is to be used?—STYPTIC.

I WOULD suggest to D. S. Thomas that the grinding surfaces of his teeth in front of the second molars be extended by filling with gold or amalgam, so that those in the upper jaw will be in contact with those in the lower jaw.—T. DWIGHT INGERSOLL, *Erie, Pa.*

REPLY TO A. B., in January number of DENTAL COSMOS.—You will have no trouble about your nitrous oxide gas becoming inert if your gasometer and all its attachments are perfectly air-tight. Pure nitrous oxide does not deteriorate by age, but very soon becomes worthless when mixed with only a slight quantity of atmospheric air.—A. F. DAVENPORT, *North Adams, Mass.*

REPLY TO J. M. H., who asks what makes black lines in his plates about the air-chambers.—The question is very easily answered. The plates are too thin in the center, and the celluloid has to be forced from the sides where there is more material, and the consequences are that where the celluloid meets to fill up the deficiency in the center of the plate, there will be those black lines. This point I ascertained by actual experiment.—J. W. H.

ANSWER TO J. M. H.—Put only enough water into your apparatus to cover the bottom, and not get it into the flask. When the water covers the flask and the plate folds, it is sure to make a dark mark.—O. J. HURD, *Cleveland, O.*

ANSWER TO J. M. H., who would like to know how to prevent the dark marks in celluloid plates.—The cause of the dark lines is the over-lapping of the celluloid. Make your mould-plate thinner than the celluloid blank, then you will have no dark marks with or without air-chambers.—J. E. H., *Philadelphia.*

TELL J. M. H. that if he will wrap his flask in a napkin or piece of muslin he will have no dark lines in his celluloid plates. After using the steam apparatus much sediment will be observed upon the sides and bottom of the boiler, and however clean the plate may be washed, when the water gets to boiling in using next time, this sediment floats, boils and bubbles about, and in the final closing of the flask much of it is entrapped and shows in the plate. I had much trouble in using scraps from the same cause, but since wrapping the flask I have no more of it. I do not think that such trouble would occur in the dry heat apparatus.—J. R. C.

REPLY TO J. M. H.—Your trouble with dark color in packing celluloid is neither the air-chamber nor dirt, but oxide of iron, or iron rust from the boiler being carried up by the water and deposited on your model before the plate was brought in contact. To avoid such a condition, after sound study, I hit upon the plan of having the inside of my boiler, my flask, and the follower galvanized with zinc, which prevents rusting, and now my plates come out of the plaster clean and nice. It also renders the flask more cleanly. I polish my models with soapstone by rubbing it on with my finger, and small brushes where the finger will not reach. I used to be bothered by apparent checks in the celluloid, following closely the outline of the air-chamber, which I remedied by chamfering or beveling off the chamber, I mean the lead, so that the side next the model is left the larger, and I now avoid that annoyance.—DR. E. HONSINGER.

J. M. H. wants to know how to prevent the dark line where the air-chamber is usually located. I was once troubled that way, and have since made a great many plates without the dark line, and none with it. I presume that I know the remedy. It is to have the model or wax plate only half as thick as the celluloid blank, which will prevent any folding of the material near the center of the plate. The celluloid plate will be thicker than the model, as its resistance to the plaster moulds will prevent their being brought as close together as when the wax was there.—W. E. D.

ANSWER to J. H. Burks, concerning "after-pains" of tooth extraction.—I have found nothing so beneficial for obtunding after-pains as phénol sodique, a phenate of soda, "sold by all druggists." It is indispensable to a surgeon's cabinet, and every dentist who has employed it in his practice will, I feel confident, agree with me in the assertion. Saturate a pellet of cotton in the above preparation, apply it to the socket, and dismiss your patient.—J. A. CHAPPLE, D.D.S.

S. F. G. is informed that he can prevent the wearing of a rubber plate making a sore mouth by covering the model, when ready to bring the two sections of the flask together before vulcanizing, with a leaf of gold-foil. This method adds very much to the appearance of the plate and protects the alveolar ridge and palate from contact with the rubber. Plates covered in this way never make sore mouths.—H. H. M.

SALICYLIC ACID IN DENTISTRY.—In reply to Penn, in the January DENTAL COSMOS, who asks for information as to the uses of salicylic acid in dental practice, we give the following extract from an article by Dr. Ostermann, which appears in the recent edition of Taft's "Operative Dentistry."—EDITOR DENTAL COSMOS.

In cases where the pulps of the teeth are changed through suppuration and gangrene into a foul, disagreeably-smelling, gas-evolving mass, it is well known that if they are filled without first restoring them to a healthy condition, periostitis will in all probability result. In such cases I introduce into the nerve-canal salicylic acid, and then make a temporary filling, which I allow to remain for several days. In order to make the stopping more secure, I saturate a piece of spunk with an ethereal solution of salicylic acid, and with it fill the pulp-chamber. The results in a large number of cases were good. The decaying, offensive nerves in the root-canals become fully deodorized and shrink into a mummified detritus. Such detrital matter can neither by evolution of gas nor putrid secretions irritate through the apicial foramen. I will here remark that it may be difficult to effectively introduce the dry salicylic acid into the root-canals. If such be the case we can have recourse with advantage to a concentrated solution of the acid in ether, which will volatilize in a very few moments. This course will be especially indicated in the molar teeth ; in the incisor teeth and pulp-cavities where cleansing can be conveniently performed it should never be neglected. After washing the canals with the above solution, we saturate a piece of spunk, place in the bottom, and then fill with any material that may be desirable.

In the treatment of suppurating pulps, dry salicylic acid may be employed with advantage. In erosions and in inflamed conditions of the mucous membrane and jaws, I have applied salicylic acid with success. In stomatitis and scorbutic inflammation of the jaws, where the borders and inter-dental papillæ appear degenerated, gangrenous, and are coated with a putrid stinging secretion, I have applied salicylic acid mixed with equal parts of powdered cassia and cinnamon with a soft brush. The foul taste accompanying such conditions, also the ill-smelling breath, soon disappear. It may here be added that in every inflammatory condition caused by roots dead or affected by periostitis, salicylic acid will prove an admirable remedy.

Aside from the application of salicylic acid in special cases, I have employed it as an everyday means of purifying the teeth and mouth, with the best results.

For a disinfecting mouth-wash: One part of salicylic acid to three hundred parts of water will be sufficient; or if a stronger solution is required, it may be prepared by adding three parts of phosphate of soda and thirty parts of distilled water to one of salicylic acid.

It forms a valuable addition to most tinctures and tooth-powders.

THE annoying failure, spoken of by Prof. Wildman, in working celluloid plates on metal models may be entirely overcome by covering the model with a leaf of gold or tin-foil before putting the two sections of the flask together. The foil entirely prevents the material from adhering to the model. I do not work celluloid in any other way,—always on metal models.—H. H. MAXWELL, *Centre*, *Shelby County*, *Texas*.

I HAVE just taken impressions for full upper and lower dentures for a lady where the space between the upper and lower gums is one and one-eighth inch, and still the gums are of about average length. This is fully one-fourth inch greater space than I have ever found necessary to retain to give a correct appearance of the face and jaws, even if the gums were unusually short. I have another patient who cannot open the mouth this wide, and the space for the teeth is only three-eighths of an inch.—W. E. D.

MY lathe is an old one, but being an old friend, I am loath to part with it, though it has troubled me exceedingly by getting gummed up, so that it could not be used. Recently I was about to take it to pieces to clean it, when a jeweler standing by said, " Don't take it to pieces. I can fix it in half a minute." Then taking some *kerosene oil*, he lubricated it, and in a few minutes my lathe was as good and clean as when it first came from the factory. Doubtless others in the profession are similarly troubled, and hence I send the above *wrinkle* for their benefit.—G. W. J.

My First Case in Replantation.—On October 1st I was called on to examine a very sore superior first bicuspid on left side. All applications and treatment, including depletion, failing, I determined to extract, and, in the event of the condition of the root being favorable, to replant. Examination revealed the fact that a branch had been *broken* off and left protruding through the apex of the root a quarter of an inch. The posterior side of the root had been *drilled* through and the gold forced through the aperture, acting as a further irritant to the periosteum. I filed off the root, which was somewhat curved at its extremity, and filled the cavity in tooth (the root having been filled two years previously); cleansed the socket with a mixture of equal parts of oil of cloves and creasote and glycerin. I placed the tooth into water of about blood heat, replaced it in the socket, and confined it in place by means of a rubber *splint* made from ordinary base plate. It has now been over two months since the operation, and I learn that the result is very satisfactory to my patient.—Frank L. Harris, D.D.S.

Reply to Dr. R. M. Reynolds.—In glancing over the December number of the Dental Cosmos, which I imagined I had read quite thoroughly, I notice a criticism from the pen of Dr. R. M. Reynolds, of New York, on an article of mine which appeared in the September number of the Dental Cosmos, entitled "Replantation of Superior Lateral Incisor."

Dr. R. takes exception to this expression: "As there was no other alternative except to extract the tooth," and ventures the assertion "that it was entirely unnecessary to extract the tooth." He then volunteers his method of operating on teeth in the condition which he imagines the one to have been which I replanted. I would say to Dr R. that his plan is one which I have been pursuing to some extent for the last seven years, except in cases where I remove the filling instead, or where it was utterly impossible to bring any pressure to bear on the tooth on account of its loose and painful condition, as was the case with the incisor mentioned in my article. True, I might have entered into a more elaborate description of the condition of the tooth, and said in so many words that any pressure upon it whatever was unbearable to the patient, who was in a very weak and nervous state, and that I had first attempted to remove the filling, and been told by the gentleman that he would not submit to any operation on it whatever, but demanded its extraction, and that it was then, and only then, that the idea of replantation suggested itself to me. I say, I might have stated all these things had I not deemed what I had written on the subject explicit enough to be understood. If Dr. R. will put himself to the trouble to refer to my article once more he will find the following, viz.: "I found the lateral incisor so loose in its socket that it could seemingly be removed with the fingers." Now, I submit it to any dentist to say whether it would not have been easier and less painful to the patient to remove or puncture the gold filling than to have drilled through the perfect enamel and tooth-substance on the palatal surface, as Dr. Reynolds suggests?

Again, he says, "And further, that from his description of the case the inflammation had not extended to suppuration." I would ask him, if he had extracted the tooth, as I did, and found the root-canal entirely filled with pus, would he not have been tolerably well satisfied that suppuration had set in?—A. H. Hilzheim, *Jackson, Miss.*

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 174.)

3. *Partial luxation of the aching tooth.*—In years gone by this method of devitalizing the dental pulp was much more frequently practiced than at present. The operation has gradually become almost obsolete, from the fact that the requirements so very seldom demand it; and yet completeness in this direction compels its notice, and mention of its detail.

During a practice of nearly thirty years, I have performed "partial luxation" but once.

It was during the early days of my California experience that I was desired to relieve severe suffering from an exposed pulp in a very useful tooth, and had only forceps with which to comply with the request. I therefore turned the tooth partially out of its socket, thus breaking the connection of its pulp-filament with the superior dental nerve and causing immediate cessation of pain.

Upon requesting the patient (a powerfully-built man) to close firmly upon the tooth for the purpose of restoring it to position, he obeyed with the firmness and rapidity of a steel-trap, and fainted! A full dose of the *usual pioneer restorative* was administered, and consciousness soon restored. After about a week the tooth became sufficiently solid to be of some use in easy mastication, and in about three weeks was *apparently* as good as any of the others. This tooth remained perfectly comfortable and serviceable for several years, when it was severely injured in an attempt to straighten a tenpenny nail, and became so very painful that it was extracted.

The only modifications of practice which I would suggest, should the operation of partial luxation be compelled by the same circumstances which controlled me, are the replacing of the tooth gently and slowly by means of the forceps, retaining for this purpose the grasp of extraction, and the proper completion of the operation by the subsequent extirpation of the pulp so soon as the tooth had acquired a comfortable acceptance of its new condition.

4. *The use of appropriate medicinal applications.*—For many years the continued application of some of the *essential oils*, as sassafras, cloves, or cinnamon, has been a favorite method of accomplishing the devitalization of pulps.

That pulps will die under such treatment is unquestionably true; but whether these oils really aid in hastening death, is not so positively accepted. Indeed, it is much more probable that the pressure of the cotton upon which they are applied, and which is rendered possible by their notable obtunding power, acts as a mechanical obstacle to the ordinary pulp-functions, and thus a comparatively rapid and easy death results.

Certain it is that, in the present day, we successfully employ these same essential oils, being guided by knowledge and judgment in their use, for pulp-preservation instead of pulp-devitalization.

Nitrate of silver (argenti nitras), or lunar caustic, which is merely nitrate of silver melted, and cast into moulds for obtaining the cylindrical stick form, was also employed as a devitalizing agent.

Having never used this article for this purpose, I cannot speak of it from the experimental stand-point, but its easy abandonment by nearly all who used it would lead one to infer that it had more demerits than merits.

Arsenious acid—white oxide of arsenic—arsenic—ratsbane.—Symbol, As; equivalent, 75; *source*,* arsenic "generally occurs as an alloy with iron, *cobalt*, nickel, copper, or tin; also as an arseniate of the above metals, and more rarely in union with sulphur, forming *realgar*, AsS_2, and *orpiment*, AsS_3."

"*Preparation.*—When arsenical sulphide of iron is roasted it undergoes oxidation, and its combined arsenic is converted into arsenious acid, AsO_3.

"The latter is conducted by the furnace-flues into large chambers, where it condenses as a white mealy powder.

"By heating this acid with pulverized charcoal in a Hessian crucible, upon the top of which a second crucible has been luted, the reduced metal is sublimed as a coating on the upper crucible."

Medicinal properties.—According to the preparation of the arsenic and the size of the dose, and the manner of its employment, it is either tonic, anti-periodic, pulmonic, detergent, escharotic, or a *vital* irritant (poison).

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* Morton and Leeds's Students' Practical Chemistry.

In addition to these qualities in its action upon living tissue, it is powerfully *antiseptic*, and is therefore employed for this purpose in the preservation of some *dead* tissues, as the skins of animals (taxidermic). It also prevents putrefaction in the *entire tissue* of such animals *as are devitalized by it*, and tests for arsenious acid show its presence in *every organ and tissue.*

"*Tests.*—Before the blow-pipe evolves a peculiar odor of garlic."

This is a simple and efficacious test for the *purity* of arsenious acid, for its sublimation (carefully done so as not to inhale the fumes of arsenic) will show any ordinary adulteration *by an unsublimed residuum.*

"With ammonio-nitrate of silver arsenious acid gives a yellow precipitate. With ammonio-nitrate of copper arsenious acid gives a green precipitate."

Marsh's Test.—In a hydrogen generator introduce the substance to be tested; after the generation of the hydrogen turn the escape-cock and ignite the gas. "If arsenic be present, a glass or porcelain plate held in the burning jet of hydrogen will be coated with a metallic mirror of arsenic."

Reinch's Test.—Macerate the suspected tissue in sufficient water, add one-tenth of the bulk of the fluid of hydrochloric acid, and boil it for half an hour (?) with bright copper foil.

"The reduced arsenic will be deposited as gray metallic crust upon the copper."

Arsenious acid, as a devitalizer of the pulp, was introduced to the profession by Dr. John R. Spooner (dentist), of Montreal, in the year 1836. The announcement of this valuable adjunct to practice was met by that opposition and *vituperation* which has been the usual greeting of every solid advance in dentistry during the past half-century.

The enormity of daring, even the *suggestion*, of placing RATSBANE in the mouths of patients was dilated upon, and the practice condemned as being "abominable," while it was at the same time stated, as *experimentally proven*, to be *a fraud!*

Very soon the *almost* inevitable results of arsenical (or any other) pulp-devitalization, *without extirpation*, became pronounced, and the peridental irritation and subsequent abscess were duly accredited *to the arsenic!*

The "better members" abandoned and discountenanced its use, while the "workers" commenced experimenting in earnest: quietly, cautiously, prudently, systematically, and patiently, developing the possibilities of this "boon to humanity."

In due time, to the astonishment of the many, it was discovered that the few were still, and *always had been* (!), more and more satisfactorily using the condemned arsenious acid; that this remedy, so far from having been removed from the dental pharmacopœia by their protestations, had every year gained in favor and in strength; that the better and only plan for them was to accept the situation; thus arsenic has taken its present position. It is unnecessary for me to follow, even as a matter of history, the gradual advance which has been made in our knowledge of the utility and action of arsenious acid; but it is eminently needed that I should state that the teachings which I shall give in this connection are *not the teachings* of any other text-book, nor are they the *accepted doctrines of any other teacher* that I know of.

Hundreds of dentists, both in this country and in Europe, are practicing with great satisfaction to themselves, and permanent comfort to their patients, by following that impress which, as incumbent of the chair of Therapeutics, I was favored with the opportunity of making.

For more than twenty years I have been systematically noting the results of arsenical applications; for all that time I have carefully watched the practical workings of this method of pulp-devitalization, and have, I think, allowed ample time for the refutation or corroboration of investigations; and as the result of all these years of experience in this direction I shall teach upon the basis of four distinct assertions:

1st. That the general belief as to the *solubility* of arsenious acid in creasote or carbolic acid, and the consequent ability of making a *solved* paste by the mixture of these two ingredients and the addition of a salt of morphia, *is erroneous*, and that the "arsenical paste," so called, is merely held in form by mechanical mixture, and as such is liable to, practically, complete separation by specific gravity, the arsenic forming the lower stratum, the morphia occupying the middle position, and the creasote remaining as a supernatant fluid. Therefore, that the mixture should be made and kept *thick*, and should *always* be stirred up thoroughly with the point of a probe before being used.

2d. That the teaching of even the most recent issues of text-books in regard to the irritation of tissues through apical foramina by arsenical applications is *utterly fallacious*, so far as *fully-formed* teeth are concerned, and only possible through very large openings in *unformed roots* of permanent teeth and partially-absorbed roots of deciduous teeth.

3d. That while it is *usually* unnecessary that arsenical applications should be left in teeth for any great length of time, it is still *possible* that weeks, and even months, *may* be allowed to pass, during which it may remain without danger of trouble, much less of untoward result. Therefore, that a sufficient length of time may be safely given such application for the purpose of complete devitalization of the pulp; thus rendering the operation of "extirpation" entirely painless, instead of being, as frequently experienced, excessively painful.

4th. That when, in any case, peridental irritation finally supervenes, *it is not due to the arsenious acid application*, IF PROPERLY MADE, but must be attributed and traced to some other cause, and treated accordingly.

I cannot be otherwise than well pleased as I review the guarded and "suggestive" manner in which I first ventured to question the received opinions upon the subject of arsenic and arsenical treatment and results. It cannot afford me other than satisfaction that I wrote, sixteen years ago, under the feeling of duty, and presented what I believed, "trusting implicitly in the stability of the position that truth will maintain itself against all assailants, and that what are thought to be facts, *and are not so*, will be eventually shattered by their own worthlessness."

I have taught and practiced according to these teachings for now sixteen years, and, so far as I know (and I know of most), nearly all the teeth which were experimented with are still in active service. A few of the patients have died, and *in every instance* the experimental teeth remained, doing good and comfortable duty until the end of their lives.

Even the "left inferior second bicuspid, of nervo-lymphatic temperament," in which the arsenical application was placed in 1864 to remain a month (then my usual practice), and, from circumstances beyond my control, was not removed until *one year and three days* after, was in service two years since, and I presume is now,—*twelve years since an application of one year's duration.* Surely, in a lower bicuspid, single-rooted, straight-rooted, a funnel in which *nature* rivals *art* (inverting things), the arsenious acid ought, if such a thing be possible, to have incited peridental irritation by *mere force of gravitation!*

Certainly sufficient time for testing the truth or fallacy of my position has now elapsed, and I may be pardoned for *teaching* a practice which I have proved reliable and satisfactory alike to *patient* and practitioner for *nearly twenty years.*

NOTE.—I would request that those who are sufficiently interested in this subject would read the articles in the July, October, November, and December numbers of the COSMOS for 1868, on "Arsenious Acid as a Devitalizer of the Dental Pulp," for, while I think their perusal necessary to a complete understanding of the subject, I shall regard the reprint of much of that material undesirable at present.

Having now reached that point at which the devitalization of a pulp seems to be rendered imperative, and having decided to effect this by medicinal application, it behooves us to consider,—

1st. *The form of application.*—This may be regarded at present as reduced to two forms of arsenious acid compounds, viz., the *powder* and the *paste*, for while cobalt (due to the arsenious component for its efficacy), capsicin, cantharidin, and other medicaments, have from time to time had their experimental existence as devitalizers, the members of the profession generally have finally accepted arsenious acid as their *active agent.*

The *powder* of arsenious acid is made by putting 1 part by weight, say gr. v., of arsenious acid into a mortar, and rubbing *in by gradual addition* 2 parts, say gr. x., of acetate of morphia.

This is kept dry, and when required for use is taken in small quantity upon a very small pellet of cotton, which is first saturated with creasote or oily carbolic acid, and then touched to the powder.

The *paste* of arsenious acid is made by rubbing together thoroughly upon a slab, with a spatula, arsenious acid, acetate of morphia, and creasote or oily carbolic acid (usually sold for creasote), in the proportions of 1, 2, 2.

℞.—Acid. ars., gr. v. Basis.
Morph acet., gr. x. Adjuvans.
Creasotum vel acid. carbol., gtt. x. Constituens.
Misce.

As has been stated, this forms a mechanical mixture, and as such is liable to easy separation; and it is for this reason that the *acetate* of morphia is preferred to the sulphate of morphia, as the former possesses the greater specific gravity. Moreover, as an *endermic* application (to which the usual pulp-application is analogous), the acetate is decided to be less irritating than the sulphate.

This paste should always be stirred up with a probe at the time of using, and then applied either from the point of the probe or upon a small pellet of dry cotton. If the pellet of cotton upon which a *paste* application is made be moistened with creasote or carbolic acid, it should be but slightly moistened, as there is danger of thereby rendering the paste too thin, and thus making it "spread" unnecessarily. The non-observance of this little precaution has eventuated in many peridental irritations, which have been directly and *most erroneously* ascribed to arsenical penetration of apical foramina.

2d. *Mode of application.*—There is probably no manipulation in dentistry which requires a greater degree of accuracy and judgment *for the attainment of the best possible results, in every instance,* than the making of an arsenical application.

This uniform success is dependent upon four considerations: 1st. A proper preparation for the application. 2d. The proper placing of the medicament. 3d. The proper guarding against danger from the *arsenic*. 4th. The proper maintenance of the application in position.

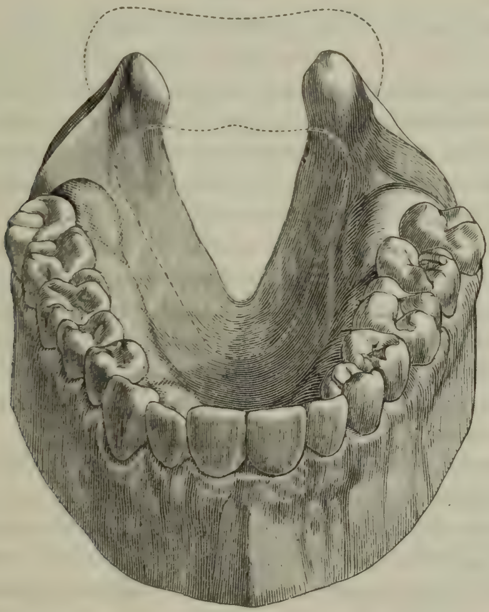
(To be continued.)

AN EXPERIMENT WITH ARTIFICIAL PALATES.

BY NORMAN W. KINGSLEY, NEW YORK.

THERE came to me in 1865 a young man seventeen years of age, with congenital fissure of the palate, which was confined almost entirely to the soft tissues, the apex of the fissure being in the border of the palate bone. There was no harelip and no external deformity to indicate a defective organ within. His speech had all the characteristics accompanying the average case of fissured velum, being so defective that it was with difficulty he was understood by strangers. He belonged to a family of excellent social standing, had the advantage of a good education, and was fitted by training to take part in a business in which his father was largely interested. But his inarticulate speech was an obstinate bar to his advancement.

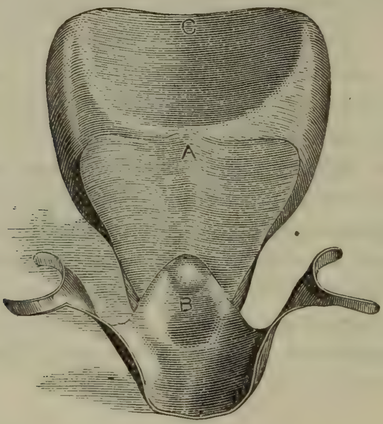
FIG. 1.



I made for him an artificial velum of soft vulcanized rubber. The model of the fissure is shown in the accompanying illustration, Fig. 1.

The velum, which is shown in Fig. 2, letter A, was attached to a gold plate marked B, which was sustained in its position by clasping to the first permanent molar on each side of the mouth. This artificial palate when worn bridged from side to side, and covered all the fissure from the apex down to the junction of the bifurcated uvula with the soft palate. That portion in Fig. 2 marked C reached across the pharynx in a somewhat horizontal position, and came nearly in contact with the constrictor muscles of the pharynx. Articulation was therefore made possible with this instrument, because the action of the levator muscles was such that the artificial velum could be lifted until it touched the posterior wall of the pharynx, and thus shut off the nasal passages at will.

FIG. 2.



Immediately on the introduction of this instrument the patient put himself under the vocal training of a professor of elocution. His improvement in articulation was rapid, and he was enabled very shortly to consummate his desires by taking part publicly in business. His mastery of articulation was so satisfactory to his friends and himself, that he became one of the most grateful persons for whom I ever rendered a service.

Such an expression as this came to me after a time: "I had the strongest desire as a boy to become a teacher in a Sunday-school when I came to be old enough, and it was a most painful thought that I should always be debarred that satisfaction by my defective speech. Now I am superintendent of a flourishing mission school, and I am constantly called upon to use my voice in that capacity, and in others, sometimes for an hour, before a mixed audience, and I am told no one would suspect that I ever had a defect of speech."

I found in process of time that this patient, by his experience and more than ordinary intelligence, was a valuable aid to me in studying the mechanism of speech with an artificial organ, and, after a ten years' experience with an artificial velum, I proposed to him to make a change for an obturator.

I had reflected much on the principle advanced by Suersen in 1867, of educating the constrictor muscles of the pharynx to become organs of speech, and I had applied this principle in some cases with more or less success; but I desired to put the principle to a more scientific test than I had yet an opportunity to do.

The case of my patient before described would give me every facility by an intelligent co-operation.

My model of the fissure was obtained, which of course was the same as shown in Fig. 1.

Upon this I formed a mass of softened gutta-percha, filling up all the roof of the cast to a level of the teeth, and projecting into and through the fissure. Its direction followed the incline of the sides of the gap to about midway its length, when it was continued horizontally backward, and terminated in a lump or bulb about the size and shape of an ordinary Spanish chestnut.

This mass when cold was introduced into the fissure, and after some slight changes of form the bulb was softened in hot water and again introduced. The patient was directed to swallow immediately and as frequently as possible.

These experiments of softening and exposing to the pressure of the constrictor muscles in swallowing were continued until there was no perceptible reduction in size or material change in the form of the bulb. This muscular activity had driven a portion of the mass upward and another portion downward, clearly and distinctly marking the boundary of the superior constrictor. Such portions of the bulb as had been squeezed beyond what was needed to shape the obturator were trimmed away, and the whole more symmetrically formed previous to making a duplicate in vulcanite.

A final test of the utmost possibilities of contraction of the pharyngeal muscles was made after all the reduction in size had been obtained from the yielding of the mass.

Any substance of sufficient stability to retain its position would resist somewhat the power of muscular contraction; therefore, after the mass was carved into shape it was gradually reduced in size where the muscles came in contact with it until they would barely touch it in the process of deglutition. As this could not be determined by the eye the test was made by painting the pharynx with a little paste of chalk and water, and contact with the wax or gutta-percha surface would show very distinctly.

Having determined with the utmost nicety the ultimate form of the obturator, it was duplicated in substantially the same way as is usual in making artificial dentures on a vulcanite base, with this exception. Being desirous of making the whole instrument of as little weight as possible I made the bulb hollow in the following manner: After the gutta-percha form was removed from the flask and the mould was ready for packing with rubber, I made a paper pattern in sections of the hollow chamber in the flask which represented the bulb. By cutting out the sheet rubber to the shape of these patterns and joining them together at their edges the bulb was approximately formed, care being taken to have it small enough to drop readily into the chamber where it was to be vulcanized. Previous to closing this unvulcanized bag a few drops of water were introduced, and the bag hermetically sealed, the edges being moistened with a little chloroform to insure their adhesion. The remainder of the space in the flask was packed in the usual manner, and the whole vulcanized with no other than the ordinary care.

The result was that the steam formed within the bag expanded it without bursting and drove it into all the inequalities of the chamber, and thus produced an obturator so light that it would float in water. This was finished up and given to the patient to experiment with.

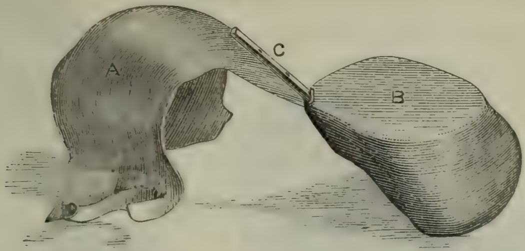
Fig. 4 represents substantially the form of this vulcanite obturator. The broad surface of the rear of the bulb is essential to the complete closure of the posterior nares, as are also the high sides which come in contact with the levatores palati. I have recently seen an instrument which pretended to carry out the Suersen principle, but it was a simple flat tongue in the fissure without sides or rear surface, and the result was a complete failure. It was only an aggravation without benefit.

In a few days he returned with much to say in its favor, but also relating that it was impossible to produce certain sounds which he had learned to do with ease with his former apparatus. The gutturals were especially defective, showing that either the pharynx did not meet the obturator, or that the dorsum of the tongue failed to make close contact with it, or possibly both. I came to the conclusion, however, that as the artificial velum followed down the line of the fissure to a much lower point than the obturator did, the tongue had been accustomed to being elevated to only such a point where it expected to meet with sufficient resistance to retain the sound until ready for the explosion. If now, as in case of the obturator, this base of resistance were removed farther from the tongue, the sound would naturally be defective in proportion to the distance.

This led me to an experiment to test the best point at which an obturator should stop to be met by the tongue for articulation.

I cut the bulb from the apparatus, leaving it simply as a plate across the roof of the mouth, with a thin tongue-like extension continuing down in and along the line of the fissure shown in Fig. 3, letter A.

Fig. 3.



Upon the posterior surface of this tongue was riveted a bar of gold about one-tenth of an inch in width by half that in thickness, and five-eighths of an inch long, beveled inwardly toward the plate and running lengthwise (letter C).

The bulb, letter B, was then fitted to the bar with a dove-tailed groove, which would permit it to slide up and down the bar for a distance of half an inch, thus permitting a very extended range of movement by drawing it higher up into the posterior nares or dropping it down into the pharynx. The bar fitted the groove so tight that it would keep any position in which it was placed. Equipped thus with a machine that he could alter at discretion, my patient began again his experiments, and in the course of a fortnight returned to me with the discovery of the exact point at which the bulb must be set to give him the greatest benefit. This point was at a much lower level than the instrument had originally provided, being nearly as low as the uvula, and where I would have supposed before that it was impossible to tolerate so large an unyielding mass during deglutition, but I found that he had worn it during meals without discomfort. His voice and enunciation were so much benefited that I was encouraged to take the next step and reproduce the instrument in gold.

The roof of the mouth being very high in the center, the cast was filled up at that point so as to bring the golden roof at a lower level and make the dome more symmetrical and better formed for enunciation. Subsequently this space above the gold plate was filled with vulcanite. Twenty-carat gold was used in both plate and bulb, that which formed the bulb being rolled down as thin as it was possible to work it, and the whole being a very accurate duplicate in form of the perfected instrument in vulcanite. Fig. 4 shows two views of this instrument—a side view and a rear view.

I was not surprised to find my patient return to me in a few days with gratitude and praise unbounded. I had before made obturators of gold, and upon the same principle, and had always observed the marked improvement in voice that a metallic sounding-board gave over one of either hard or soft rubber. In the present instance the gentleman, after wearing it a day or two until feeling quite familiar with it, called to his aid a professor of elocution and went into a large public hall, and for an hour subjected himself to criticism in reading, in singing, and in declamation.

Fig. 4.

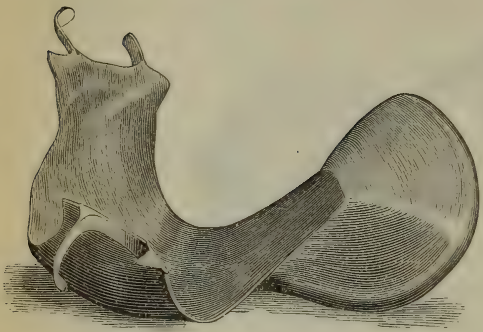
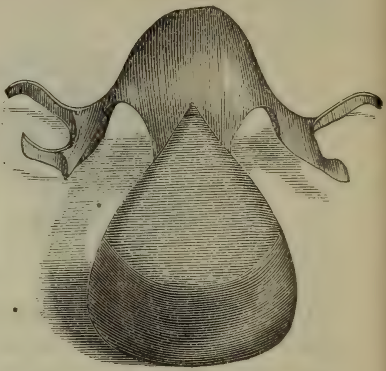


Fig. 5.



The professor pronounced his effort as absolutely without fault, and the clearness, distinctness, and resonance of his voice remarkable.

The sum of my experience with obturators is this—

1st. That of all obturators this is the best form for a congenital fissure; but, while the wearer is enabled to articulate perfectly with such an instrument, it is only *after* he has learned articulation with another apparatus.

2d. That a soft elastic artificial velum is much better adapted to the acquirement of articulation than an unyielding, non-elastic substance; but when acquired an obturator may be substituted.

3d. That in very rare cases articulation may be acquired with an obturator only; but it is the result of the extra activity of the pharyngeal muscles, while with the elastic velum the levators of the palate contribute largely.

THE HOMOLOGY OF THE DENTAL TISSUES, THEIR SUSCEPTIBILITY TO SUPPRESSIVE ECONOMY, AND THEIR PRESENT DEGENERACY IN MAN.

BY A. H. THOMPSON, D.D.S., TOPEKA, KANSAS.

Part II. Susceptibility to Suppressive Economy.

The homology of the dental tissues with the tissues of the derm, and the special identity of the enamel with the extra-vascular appendages, render it certain that they are governed by the same laws, are subject to the same influences, and possess the same phenomena of character as the allied tissues. Community of origin and similarity of structure and nature necessarily establish identity of the manner of life, of the methods of maintaining life with its varied phenomena, of similarity of service rendered to the economy, and of the process of final dissolution and expulsion from the system. The relationship and homology of the teeth with the derm and its varied appendicular productions are established by demonstration. These appendages are as diverse in form and peculiarity of nature as tissues can well be and yet preserve the unity of character which they do not fail to do. Teeth, spines, scales, dermal plates, feathers, nails, hair, bristles, horn, hoof, etc., varied in form and apparent purpose as tissues can well attain, are yet closely related in structure and function, with variations, of course, within certain limits.

The resemblances of character between the teeth and other dermal productions, to which our purpose at present directs our attention, are (1) the use and function of the teeth, and (2) their transient and inconstant nature. In these we claim that they are but related to and resemble the other structures of the derm.

(1) The use and purpose of all extravascular appendages is, primarily, the protection of the derm and the sub-dermal softer tissues against the friction, contact, or other deleterious influence of foreign substances. This is the self-evident purpose of the erection of all super-dermal structures. Extra development of these parts for special effectiveness in particular offices is secondary to the primary function of mere protection of the derm.

Epithelium is a universal and inseparable characteristic of the external surface of all skin, from the lining of a capillary to the sole of the foot, and is such by virtue of its power to resist the contact of substances foreign to the skin or the soft tissues beneath. Epithelium being present, and the demand for a tissue more dense arising to resist a certain external influence that promises to be deleterious to the skin and soft parts, the result, if life is to be maintained, would be the development from the epithelium, as the most external tissue, of an organ to meet the emergency. We can see how hair thus became developed as a protection against cold as a primary purpose. The epithelium was insufficient to protect the soft parts from the weather, and a new product, modified from the epithelium, arose. We can see how this product was further evolved for the secondary purpose, in many instances, of ornamentation by the influence of sexual selection, or how the color of the hair has been controlled by natural selection and developed into mimicry for protection against enemies or the capture of prey. Or again, as tactile organs to supplement the sense of touch. In birds we can see how a different dermal production, feathers (possibly on account of reptilian affinities, feathers being more nearly related to reptilian dermal plates than to mammalian hair), were primarily evolved for the protection of the derm from the contact of water, and became subsequently modified for the purpose of aerial locomotion. Feathers are also subject to the secondary purposes of ornamentation and protective mimicry (Wallace, "Contributions to Natural Selection"). In the case of the nails of the digits, which were apparently developed for the primary purpose of the protection of the derm in digging in the ground, we see greater effectiveness reached by special development for the purposes of seizing prey and climbing. Or in hoofs, protection is afforded the derm and speed facilitated by special modification and development of the nails, as a secondary purpose. In spines and dermal plates, we have, perhaps, the simplest form of protective organ, and which takes on somewhat of ossific or endo-skeleton structure and affinity. In some forms, however, as the scales of fish, the secondary purposes of ornamentation, etc., are attained, but as a rule these productions aspire to simple protection of the derm. In this they illustrate the primary object of the development of all dermal appendages as protective organs in their simplest purpose.

We therefore claim that the teeth have had the same purpose of organization, and that they were produced originally as mere dermal structures for the protection of the skin of the jaw against the friction of food in mastication, and were subsequently developed into organs of various forms in different species. This variety was developed for the purpose of special effectiveness in the peculiar use of each species in the work of reducing its particular food. This, we claim, is the story of their life. We see this illustrated by the resemblance between the teeth and spines of the skin as mere dermal protectors, as pointed out by Mr. C. S. Tomes (op. cit.), as follows: "Just as in the external skin bony or dentinal plates are developed for the purpose of protecting it from destruction by attrition, so for a similar purpose teeth are developed in that portion of the mucous membrane which covers the jaws."

The ossific form of dermal plate was developed very early in the history of animal life, and we find the teeth taking this form in the lowest organizations in being composed largely of bone or dentine. Both these tissues are found in dermal structures, and indicate their homology by the similarity of the circumstances of their occurrence.

Evolution of organic form, differentiation of systemic organization and of tissue, the evolution of food, and the influence of food-selection (as a power to be regarded), led to the development of progressively higher forms of dental organization. But while the teeth have reached a very elevated specialization in many forms, they universally retain their primary office of the reduction of food as their especial function. This office of the teeth can only be regarded as a single manifestation of the function of all dermal structures,—the protection of the derm. From an elementary form which afforded the rudest protection to the gum-tissue of the jaw, all progressively higher and subsequent forms were evolved and elaborated. The first step taken, natural selection seized the modification and produced the varied forms of dentures we observe to-day. We can see how the now special function of forcible mastication arose and became elaborated, and how it was developed from a simple to a complex function.

Like other dermal structures, the teeth also perform other services to the economy and fill offices that are but secondary, but that are often very peculiar and conspicuous, and, indeed, often to the extent of overshadowing the prime function of mastication. This extreme is noticed in the tusks of the narwhal, elephant, etc., and other peculiar forms. Most frequently, however, the teeth still retain some effectiveness as prehensory and masticating organs. Among secondary services we may merely note their use as secondary sexual organs, and other battle purposes, and as auxiliaries in locomotion, vocalization, ornamentation, etc. In man the employment of the teeth for their prime purpose, mastication, is still apparent and present, but the function is disappearing, and prehension is, perhaps, totally aborted. As secondary organs they retain no functions, perhaps, except those of vocalization and ornamentation; but these are, apparently, of the most conspicuous importance to the species, and are, possibly, not even second in value to mastication. Yet these functions being secondary, and not upheld by natural selection, having no natural force of sufficient power to maintain them for these services, the teeth will most probably disappear before the destructive effects of the rapid disuse of mastication. Desirable as it may be that the human teeth should be retained for the æsthetic purposes of vocalization and ornamentation which the higher physical and psychical life of the species imposes upon them, artificial selection is powerless to resist the ultimate catastrophe of their total loss. Sexual selection is probably the only force to which we can look for their support as ornamental organs, for their loss would greatly mar the beauty of the female of the species, upon which propagation largely depends. Evolution will, of course, modify sexual taste by the time we reach the edentulous age, however. Yet when we observe what a wonderful development and elaboration of beauty has been wrought in the female of the civilized races of man by the force of sexual selection under civilization, as compared with savage races, we feel that this force ought to be sufficient to maintain the teeth in a form of beauty for the purposes of sexual ornamentation. But we can scarcely hope that the iconoclastic tide of the disuse of mastication may be checked or impeded. The intellectual use of the teeth for vocalization, desirable as their continuance for this purpose would be, is a force of infinitesimal weight. It therefore seems that the abortion of the primary function of the teeth, mastication, will necessarily induce their suppression, as being a force that cannot be resisted by the influence of the importance of secondary functions.

(2) The next important resemblance of character between the teeth and other dermal productions which it is our purpose to notice, is their transient and inconstant nature—*i. e.*, that the teeth are, by virtue of their dermal relationship, in harmony with other dermic structures, subject to the phenomena of shedding and reproduction. This is exhibited in varying degrees of manifestation in different animals, but prevails to some extent in all. In the case of the dog-fish, as cited by Mr. Tomes (op. cit.), the teeth and spines are continuous, and are shed and reproduced without cessation. He says that the spines "are much less often shed and reproduced" than the teeth, "so that it is less easy to find them in all stages of their growth. I believe, however, that they follow a course essentially similar to that of the teeth." Reptiles possess a constant succession of teeth. Most of the mammalia are diphyodonts (or "heterodonts"—Tomes),—*i.e.*, possess "a milk set of teeth which is displaced by a permanent set." Some are monophyodonts (or "homodonts"), (as edentata, cetacea, etc.), and produce but one set of teeth.

The fact to be brought out is that the teeth are shed and reproduced, no matter with how much dissimilarity in frequency, in all animals possessing teeth, in a manner identical with or similar to the production, casting off, and reproduction of other epithelial and dermal structures. From the evidence afforded us we feel warranted in advancing the hypothesis, that as the teeth partake of the transitory and inconstant nature of all dermal appendages, so are they most readily susceptible to the forces that induce the suppression of special parts when permitted by disuse and coerced by the law of economy of growth. They are, by virtue of their very nature, markedly and readily amenable to an extreme degree to the physiological forces which induce the disorganization in various ways of different parts of the economy. The teeth are thus acted upon, after being formed, by the absorption of the root, and of their supporting tissue, the alveolus, which induces their expulsion. In the formative processes they are subject to marked effects of various influences, both physiological and pathological, which produce phenomena of aberrations from the normal type of conspicuous importance. These include the various abnormal effects upon the teeth, and particularly upon the enamel, of exanthematous diseases (again indicating their dermal relationship), the effects of inherited diseases (which are mainly circulatory); the accidental and inherited suppression of certain teeth and extra production of others,—which may be called infra- and supra-supplementary teeth, etc. These, among other manifestations of the capabilities of the teeth to direct suppression, either partial or total, evidence our meaning.

The teeth, like other dermal appendages, do not belong to the class of organs that are vital in their direct importance to the economy, and especially is this manifested in man. They can be altered in form and number in most species most readily and safely, and the species continue to exercise the ordinary functions of life. Profs. Huxley and Flower (*Nature*) have shown that the teeth are infinitely variable in form and susceptible to moulding influences, though persistent in tissual structure. Every species exhibits the effects of this susceptibility in which teeth have been lost or altered through changed habits concerning its food. In man the capacity for change has been brought to the extreme of his being able to lose any or every factor of the denture, and yet maintain life with ease by means of the artificial methods of reducing food which he possesses. This fact indicates his independence of teeth even in the present early stage of the progress of their suppression, and suggests his ultimate edentulous condition.

Previous articles of this series of papers have been devoted to the elucidation of the fact that mastication is passing into disuse, and that the teeth are, in consequence, subject to and in course of suppression, like all useless organs, in obedience to irrevocable and irresistible law. We now endeavor to show that the teeth are, as tissues, most readily amenable to this economic suppression, and that this has been manifested in many striking cases, illustrating this impressibility by forces, normal and abnormal, that induce variations from the standard of normality in man. The most conspicuous and valuable of these cases of variation and which demonstrate our hypothesis of the homology of the teeth, are those which are accompanied by abnormal conditions of the hair, or nails, or both. Cases of collateral abnormality of these appendages in the same individual evidence this relationship and similarity of character. This has been noticed by Mr. Tomes (op. cit.), as before quoted in this paper (Part I.), and in the following instances which he mentions: "The famous hairy family of Burmah . . with silky hair developed over the face, transmitted this peculiarity to the third generation, and in each case the teeth were very deficient in number. The case of the hairy man and his son . . . from the interior of Russia . . . were also almost toothless. . . The hairy woman, Julia Plastrana, had unusually large teeth, . . and also hypertrophy of the gums and alveolar processes.

. . . In the large teeth, the enormous papillæ of the gum, and the redundant hairs on the face, we have evidence of a disposition to hypertrophies of the integument, affecting in different places the different tegumentary appendages which happen to be there. And that the teeth are dermal appendages has been shown at a previous page." In the *British Journal of Dental Science* (1875) a case is noticed of deficiency of most of the teeth, which is accompanied by total absence of the toe-nails and rudimentary finger-nails. The following case came under the observation of the writer: Deficiency of the teeth was accompanied by a sparseness of beard which amounted to its almost total absence, although the hair and nails seemed natural. The patient (æt. about 28) did not remember losing any of the deciduous teeth except the first molars, and the denture presented the following condition: Inferior denture—bicuspids present, though separated by a space from the canine, small and flattish apex; incisors small and like deciduous teeth; canine small, round, and conical; first molars present, small; no other molars. Superior denture: incisors small and compressed; canines absent; first bicuspids small; one second molar present; other molars absent. This case of deficiency of hirsute covering, accompanied by deficiency in number and organization of the teeth, shows an interesting and valuable intersusceptibility of these related tissues. It does not matter that such phenomena are sometimes directly due to syphilis; the evidence is just the same. Mr. Geo. Barraclough (in the *Medical Times and Gazette*) speaks of the value of the susceptibility of the teeth to this disease in its diagnosis, and says, "I attach so much importance to the affections of the teeth in enabling us to ascertain the existence of hereditary taint, because of all syphilitic lesions they are the most constant. . . . That this constancy should exist and the affection be so well marked need not excite surprise when we consider that the teeth stand, as it were, structurally, half-way between the endo- and exo-skeletons." Farther on he speaks of the disease as affecting the hair and causing its loss, in a peculiar manner, exhibiting the sympathy maintained by the extra-vascular tissues. Thus the susceptibility of the teeth to abortive influences again and again points out their readiness to be affected by forces that cause the total or partial atrophy or loss of the dermal appendages, and the ease with which they are suppressed or altered in form.

Mr. Charles Darwin ("Variations of Plants and Animals under Domestication," 2d ed., 1876), speaking of the correlation of deficiency of the teeth and abnormal conditions of the hair, says, "With man several striking cases have been recorded of inherited baldness with inherited deficiency, either complete or partial, of the teeth. In an analogous case . . . that of a Hindoo family in Scinde, in which ten men, in the course of four generations, were furnished in both jaws taken together with only four small and weak incisor teeth, and with eight posterior molars; they have very little hair on the body, and become bald early in life. . . There is a . . . connection between the hair and teeth in those rare cases in which the hair has been renewed in old age, and has been usually accompanied by a renewal of the teeth." He gives instances, some of which we have noted, of redundancy of hair being accompanied by deficiency or redundancy of the teeth, all showing the close relationship of these tegumentary structures. Again, "There is a manifest relationship throughout the body between the skin and various dermal appendages, such as hair, feathers, hoofs, horns, and teeth. . . . Hairless dogs are deficient in their teeth . . . and men with redundant hair have abnormal teeth either by deficiency or excess."

In most of the cases of deficiency of the teeth, they present the condition of "arrested development." The teeth are frequently the deciduous ones remaining permanently, or the permanent erupting unpreceded by the deciduous set; but in each event they present, usually, the phenomena of imperfect and deficient organization. And what is remarkable and significant is that the variations in the teeth of man from the normal type tend in the direction of *decrease* of perfection of organization. We do not see variation in the direction of greater perfection and efficacy in man, and rarely find dentures that we can consider as up to the standard of the normal type: but our experience in observation is quite the contrary. On this point Mr. Darwin (op. cit.) says (and quotes Mr. Romanes), "All parts are somewhat variable, and fluctuate round an average point. Now, when a part has already begun from any cause to decrease, it is very improbable that the variation should be great in the direction of increase, as of dimensions, etc. . . . The long-continued crossing of many individuals furnished with an organ which fluctuates in a greater degree towards decrease than towards increase, will slowly but steadily lead to its diminution." Or, on final reduction, he says, "When a part becomes diminished by disuse prolonged through many generations, the principle of economy of growth, together with inter-crossing, will tend to reduce it still further." Deficiencies of teeth may be and are transmitted through the principle of inherited mutilations so often of marked character. In many families a single tooth, or pair of teeth, are hereditarily absent, which may have originated in a mutilation followed by accidental transmission in the first instance. In the singular cases of extensive deficiency before noted, one of the causes of transmission may have been the operation of this law.

But in all these and similar cases of partial or total suppression of the teeth, we see the peculiar impressibility which they, as extra-vascular appendages, present in common with other dermal productions. Without multiplying cases, for a few instances will illustrate a given meaning as well as a multitude, we submit that the teeth are, by nature of their homological relationship, amenable to an extreme degree to the laws that induce the suppression of a part when variation is desirable. This variation in the case of the teeth in man being in the direction of decrease of organization, the tendency is towards the result of final and inevitable abortion.

(To be continued.)

ON THE PHENOMENA OF PAIN.

BY E. W. FOSTER, M.D., BOSTON.

THE subject matter of observation about to follow the given text of this paper will relate most especially to the phenomena of physical pain in the human body,—an inquiry into (A) the nature and (B) the structural cause of such phenomena; and (C) the principles and mode of manifestation by subjective and objective symptoms.

(A.) What, then, is the nature of physical pain, or, in other words, its subjective reality in consciousness? Simply stated, pain is a sensation at once one of the most common, as it is, indeed, of all the most unwelcome. It has been the persistent shadow of man's pleasure and comfort from his first advent on the earth as a sentient being up to the present moment; and, like that in the famous shadow dance of Meyerbeer, it clings to every motion that joy and happiness may direct.

It is also like some thread of variable color, running here and there, and woven into the web of every one's life experience. Though a recognized part of our lives—a part so common, intrusive, and so ubiquitous, yet is it fringed with mystery, and we can hardly tell at times whither it cometh or whither it goeth. It seems almost as if there was a tacit consent among medical and other writers to avoid the questioning of its genesis, and with burnt offerings, with frankincense, and myrrh, and drugs, and spices, and libations, to simply appease this most august god of pain. Thus he likens to a sphynx, who through all these centuries has kept his secret well.

Pain as a dynamic force is postulated in the very core and constitution of human nature. It is an axiom in our consciousness, like hunger and thirst. And in all social and physical problems, in all matters of human import, light or grave, pain holds the one or more electoral votes that cannot be counted out. Its bearings on society and the advance of civilization are diverse, far-reaching, and important, penetrating to the very origin and development of society, and man's relations thereto. Since pain, then, is the great fact which forms the daily and almost constant obstruction to the successful progress and termination of our professional labors, its abolition or prevention becomes the central aim and purpose of both general and special medicine.

Reverting to our first question,—what is pain?—our great lexicographer says it is "an uneasy sensation in animal bodies of any degree, from slight uneasiness to extreme distress or torture proceeding from pressure, tension, or spasm, separation of parts by violence, or any disarrangement of functions" (Webster). It could not, we think, be better defined in the same space. Dunglison, in his medical dictionary, says, "It scarcely admits of an explanation," but ventures the assertion that it is a disagreeable sensation, and nearly always symptomatic,—being *acute* when sharp and violent, a *pang* when short and sudden, *heavy* or *dragging* when attended with the sensation of weight, *tensive* when the parts seem distended; and, we will further add, *lacerating* or *tearing*, *darting*, *throbbing*, *boring*, *burning*, etc. According as it is possible to express by words its multitudinous variety of sensations, the above dictionary view of pain is the one commonly accepted.

Pressing for deeper answers, however, we find that pain is intimately related to us as sentient beings, for it directly and indirectly affects us for weal or woe, modifying our comfort and well-being, or terminating all with disease, discomfort, and death,—the latter, alas! too often the only victor. Relief from this suffering pain gives is so necessary and so important to the well-being of the race, that it has become one of the cardinal virtues of our morality, and a chief corner-stone in every "credo."

Therefore it appears, that in any human life like that of our Howards, Nightingales, and others, and in that great power for good during our late war,—the Sanitary Commission,—this compassionate attention to the hurt of its kind in the red waste of battle, the prison-pen, and hospital,—is the fair, redeeming trait in our common humanity, the flower that blooms for others of exceeding beauty and fragrance. That unique and beautiful institution, the Boston Flower Mission, long ago touched this abstract view of the beneficent results of pain, and those that lie on beds of loneliness in our various hospitals, uncared for, it may be, save by these friends and their tender messengers of love, cannot express the joy and comfort these simple flowers afford.

From the first paragraph of human history, relief from physical pain has been the one great demand, whereof the vast array of medicaments now accumulated in the world is the answer.

Medicine has yet many stammering answers to the questions of disease and pain; yet the heart, the aim, the motive of the art is noble, self-sacrificing, and growing more and more helpful. In the definition of pain by negation it will be seen at once that it is never to be found in the realm of pleasure. It hovers around the festive scene like a gaunt and hungry wolf, ready at any moment to pounce upon the revelers, and maybe twist them up into colicky knots, or other diabolical shapes and torments. If we may say that pleasure in its fullness is the *zenith* of nervous exaltation, then also we must see that the fullness of pain would be expressed as the *nadir* of nervous perturbation and distress, and yet both meet at an equatorial line of general comfort and simple bodily peace. Though pain is thus diametrically opposed to pleasure, and is constantly harassing our peace and comfort, it holds at the same time a saving restraint upon most of our physical actions. It always counsels moderation, and if its first mild reminders are not heeded the command is set in another and higher key, till at last, if still disregarded, it speaks out in such tones the mightiest will must often quail before its menace. Pain, on the other hand, not only invites beneficent inflammatory action in the healing of wounds, but commands rest till the cure is effected, thus seconding most heartily the reparative forces of nature. Pain, however, cannot create; but, as shown above, though it can assist indirectly in reparative processes, it can also destroy what years have been patiently engaged in building up. Pain is one of the strongest forces sent against the human citadel. In its highest exercise it can instantly, as it were, shrivel a long nervous tract into paralysis, or compel the strongest warrior to instantly cease his strife; and, it may be, to lie down with his shield to rise again no more. Pain is also like a judge, who taking no part in the pleasures and wassail of the people, yet must preside over every infraction of physical law. In this, pain is eminently incorruptible, for he showeth no fear or favor, and while all recognize the important, necessary, and onerous duties of this judge, and that without him and his inflexible law community would run riot to waste, yet all hold him in awe and wholesome respect, and dread his severer decrees with mortal terror. Though of the people, and intimate in all their affairs, yet they do not wish him in their homes,—do not care to meet him in the street or elsewhere, and would gladly pass him by on the other side. Though sometimes absent, he is never so for more than a short time.

Pain also may be likened to a majority or minority report, according to its power and circumstance; while in either, it is a protest of right feeling against wrong, injury, or disease,—a champion of right and a dispenser of justice.

It also may be called the nitrogen, or conservative force in our human, sentient atmosphere, wherein hilarious pleasure would be the rollicking, yet energetic oxygen. Pain to the physical body is also what the governor is to the more material steam engine, regulating the motion, and governing the balance of waste and demand; checking the speed of the whole mechanism, or equalizing and distributing force as it may be required. If pleasure may be called centrifugal, or expansive, then pain may be called centripetal, or contractive,—which is its most eminent symptom. Pain has a gamut, co-extensive with the range and power of individual feeling. Like the theory of music, or laws governing musical sounds, pain finds all its modulations into different keys, or expressions, due as music is to certain laws. And though pain itself is a discord, like the seventh of the scale, it is based on the natural order of progression, and the power of sensory nerves to distinguish such progression. It is the animus of medicinal remedies that they aim to destroy or prevent the original intent or natural conclusion of pain,—the sequence of its logic, as it were; yet, extensive and variable as pain is, it has greater capabilities of power and intensity in some localities than others,—in one nerve tract more than another.

The great hyper-sensitive fifth nerve, of all others, is most frequently attacked, owing to its various and intricate offices, its position, and course; the latter frequently taking long distances in bony canals; and especially subject to irritation and pain in its second and third branches by reason of defective teeth. Further, all those dreadful series of tearing and distracting pains, yclept neuralgias, are mostly to be charged to this nerve, though it is equally susceptible to the most exquisite pleasures! Pain is also a main-spring of involuntary action or motion, as likewise pleasure may be, but with this difference: pain is more violent and tense,—evolves more heat and inflammation which point in a pathological direction. Pleasure, like laughter, is physiological; pain, like agony, distress, or disease, is pathological: they are Cain and Abel. Pain may be suicidal, for it has the power of destroying even itself, we may say; or, in other words, by its own violence, actually cutting the wires of its communication to the brain, thus ending, in part at least, its own existence. In such moments pain becomes drunk in his own gall of bitterness, and awakes in paralytic impotency, and, though once to all others invincible, at last falls on his own retributive dagger. We shall also find that pain has other limitations than even death—the end of all sensibility. And among the most prominent of these we have already mentioned paralysis; next we would add syncope; also artificial and remedial agencies; and lastly, that condition of soul, mind, and will, or the three combined,—a state so exalted in its action, or so wrapt in thought, that pains reported from external sources are ignored or entirely set aside. This last hedge or limitation of pain is often expressed in the soldier, who in the excitement and crash of battle feels not nor heeds the dull thud of the bullet as it plunges into his body. He also, that rushing out upon the cry of fire from amidst the impending flames of his dwelling, heeds not nor feels a sprained or broken limb. And lastly, the martyrs of all times, who have exalted themselves, as by a miracle, above the reach and cry of pain. It is often seen in times of sudden and appalling danger that the safety of the whole is paramount to the cry of a part. And our late war was brilliant with heroism over the stress of mortal agony. It is in this Valhalla of Heroes, past and present, that pain met its deserved and overwhelming rebuke,—for they were foemen more worthy than his steel.

(To be continued.)

THE ABUSE OF NITROUS OXIDE.

BY PROF. GEORGE T. BARKER, D.D.S.

(A paper read before the Pennsylvania Association of Dental Surgeons, February 13th, 1877.)

Nitrous oxide, as an anæsthetic, has been extensively used for about twelve years, and has proved to be in many respects efficient when judiciously administered. At the same time it must be admitted by its most extravagant eulogists that it has been exhibited indiscriminately, by those unfamiliar with its properties and appropriate uses, while the laudation that it has received by daily advertisements in the public press, which have been continued without contradiction, has led the general and even the professional public to regard it as entirely without danger, and incapable of producing harmful results.

My object in this paper is to direct attention to these errors, and to raise a warning voice against the indiscriminate use of this agent. In almost all large cities in the United States the business of extracting teeth has been taken out of the hands of regular dentists. I say "regular," because I consider that the practice of dentistry must necessarily comprise, primarily and principally, the preservation of natural organs, and not their destruction. I make the statement as irrefutable, that no one, however well instructed or dentally educated, can continue destroying organs without attempt at restoration of them to health, and at the same time be competent to decide that they cannot be preserved by judicious treatment. There is another view which we must not disregard, and that is the fact that pecuniary interest is in favor of their destruction, instead of their preservation. I refer to those establishments where nothing but extraction of teeth is performed. In one of these with which I am familiar, the operator does refuse to extract teeth under the treatment of a dentist, although importuned to do so by the patient; but if this request is backed by the desire of the family physician, the teeth are extracted. In two cases recently in my own practice, teeth were extracted, in both instances the patients being unrelieved by the extraction, and in one case the existing neuralgic tendency from dental irritation was so far increased as to confine the patient to her room for two weeks, and to cause the family physician to abandon the case, and I was again called in to give her relief from excruciating sufferings.

It may be urged that the responsibility for the extraction belonged to the family physician. I contend that the extractor was alone responsible, for I agree with my friend, Prof. Flagg, in his article entitled "D. D. S.," DENTAL COSMOS, October, 1875, page 520:

"I will not speak to you of the average medical practitioner. I esteem him as a man. I associate with him as a gentleman. I respect his average attainments. Of him I will not ask, but I will ask of the erudite of medicine, I will ask who of all their professional corps—which one among the most distinguished of their teachers—could stand with credit to himself and comfort to his patient, *five little minutes* at the dental chair?

"And why is this,—that I can ask, but none can answer?

"It is because the two great branches of the healing art are medicine *and* dentistry.

"Medicine first, oldest, and grandest, if you please. Dentistry, second, youngest, and least, if you please; but none the less medicine *and* dentistry,—distinct in their mixing as are oil and water, the emblematic fluids of the two professions!

"Year after year the lines of demarkation have become the more apparent,—methods, appliances, and rules for practice which pertain to one are unknown, unheard of, by the other; subjects may have a vital interest for the medical man, and yet possess but slight importance for the dentist; while all-absorbing questions for the dentist have not that interest to the general practitioner which can secure for them even a passing glance."

If this position is a true one, and I claim it is, then the practitioner of medicine is wholly incompetent to decide as to the advisability of the extraction of teeth, and the extractor, be he practicing dentist or not, is alone responsible for malpractice. Another fact must be here noticed, viz., that, as every dentist is aware, medical men, as a rule, do not place the value upon teeth that we do, or even that our patients do.

I could, if necessary, give scores of instances in my professional experience where patients have been sent to me with the request by the family physician that one or more teeth might be extracted to give relief to some trouble which a few moments' examination made apparent was not dependent upon dental irritation.

I recall one instance where a prominent professor in the leading medical college in this city called upon me to extract a perfectly healthy lower canine tooth for his sister, when the pain was simply *reflex*, and depended for its expression upon an exposed pulp in an erupting superior wisdom-tooth; and so offended was he at my refusal to extract that I lost the future patronage of his family, which was transferred to the individual who extracted (*with gas*) the healthy canine. Such cases, I doubt not, are familiar to all the members of this association, and I need not dwell upon them. Others, doubtless, are not infrequent, like the following:

I have known patients to leave their houses at night because a tooth was aching, in which paste had been introduced for devitalization of the pulp, and have the tooth extracted at the nearest association where gas was administered. Others have without consultation with their dentist had teeth removed, and when too late appreciated their value.

In my judgment, the statement of the extractor that the patient desired the operation to be performed in no way relieves him. He is just as reprehensible, and is just as guilty of malpractice, as if he had urged the patient to have the extraction performed. Persons in health, much less in pain, are not good judges of what should be done, and no true professional man has a right to have his judgment influenced by their entreaties. In another case which I exhibited to my friend, Dr. George W. Ellis, a sound superior central incisor was extracted (by gas), because it was, as the patient said, a "little crooked." This is no exceptional case, for I believe there is not a dentist in this room who does not know that thousands of teeth are sacrificed in this city each year which could, under proper treatment, be made valuable and useful organs.

Why is this? It is because the public believe nitrous oxide gas to be harmless, that teeth cannot be preserved when they are, as they say, "ulcerated at the root," and some extractor is at hand ready and willing to encourage them in their ignorance.

Another abuse to which I would direct attention is the attempt frequently made by extractors to perform difficult operations in the mouth by aid of the gas. I speak from an extended use of the agent under consideration, and assert that for slight, easy operations it may possibly be indicated; but for difficult cases, as the extraction of broken teeth or roots deeply imbedded in the alveolar process, it is not well adapted, as its effects are too evanescent, requiring the operator to work with such haste that serious injury to both soft and hard tissue not unfrequently results, and as a sequence sloughing and necrosis occur, all of which could have been avoided by the use of another anæsthetic, which would have allowed more time to the operator. I have notes of several such cases, and in two the sufferers could hardly be prevented from commencing suits for malpractice against a prominent extractor with nitrous oxide.

But passing from the consideration of malpractice on the part of operators who use the gas to such an enormous extent, and ignorance on the part of patients, let me ask the question, Is nitrous oxide, as an anæsthetic, harmless, and, except in well-marked organic disease, may it be used with a reasonable degree of certainty that no bad results will follow?

To this question the answer will be made by this or that extractor, "Look at the tens of thousands of patients for whom I have operated, and yet no fatal result has taken place in my office."

My friend, Dr. Thomas, claims sixty-six thousand five hundred extractions. This is good evidence regarding *immediate* immunity from bad results, but it is not evidence of freedom from after- and serious lesions of important organs as a sequence. I believe such sequence may occur a long time after the administration of the anæsthetic.

Prof. Alfred Stillé, M.D., in his great work on "Therapeutics and Materia Medica," lays down this principle:

"The safest rule is to use no more of a medicine than is requisite to produce the effect which is intended, and to continue it no longer than is absolutely necessary.

"It cannot be too often repeated that *every drug* when used *unnecessarily* is mischievous."

Let us examine the mischief which may be induced by nitrous oxide. In order to avoid the charge of prejudice, I will quote from the little work of the late Dr. F. R. Thomas, on "Nitrous Oxide," p. 61. He thus describes the symptoms of anæsthesia:

"First. By heavy and involuntary respirations much resembling the heavy or snoring sound of ordinary sleep. This is occasioned by the relaxation of the muscles of the pharynx. In some instances this heavy breathing is entirely absent, and consequently will not in all cases suffice as a guide.

"Second. The stertorous breathing is followed by a discoloration of the blood, and the face and lips become darkened. The rapidity of the circulation is increased, and the capillaries are surcharged with discolored blood, as in approaching asphyxia. To a greater or less extent the discoloration is always present, demonstrating the powerful physiological action of this agent on the circulation. This appearance is exceedingly annoying, and has led physiologists to associate it with asphyxia, as the resemblance of the symptoms to it is very marked.

"Third. When narcosis has been completely produced, most patients exhibit a twitching of the entire muscular system, but this is particularly noticeable in the muscles of the face, the back of the head and neck, and also in the hands. The combination of these symptoms furnishes the guide to complete anæsthesia. It is reasonable to expect to meet them all in a majority of cases."

The explanation of the symptoms detailed agrees with my own experience in hundreds of cases. Let us examine what pathological condition has been induced. Again, rather than offer my own conclusions, I select the following. In the "Essentials of Practical Medicine," by Henry Hartshorne, M.D., p. 222, we find the description of a pathological condition which is not *very* unlike that detailed by Dr. Thomas:

"*Congestive Apoplexy Symptoms.*—Premonitory symptoms often seen are flushed appearance of the face and eyes, heat of head, throbbing of the carotids, distension of the temporal arteries and jugular veins. The attack is marked by sudden stupor, with slow and sometimes snoring respiration, full and slow pulse, dusky or turgid appearance of the face. The total loss of perception may be brief, its partial absence or deficiency continuing for some time. Slight convulsive movements are not uncommon. Paralysis of the muscles occurs only a short time after the attack if recovered from.

"The *immediate danger* connected with an attack of apoplexy should not be considered over for at least ten days after the stroke itself. Very seldom after a hemorrhagic attack are the mental or bodily powers so good for the rest of life as before."

I ask any unprejudiced mind if this description differs in any essential particular from the symptoms of anæsthesia from nitrous oxide? If not, do we not in every case induce congestive apoplexy, and have we any right to expect immunity from subsequent lesions?

You will notice that Dr. Hartshorne says *immediate danger* should not be considered over for ten days at least, but mental and bodily powers are seldom so good as before. I do not urge that in every case of anæsthesia from nitrous oxide such a sequence, though possible, will actually result; but that it does occur in more cases than we are aware of, I firmly believe. Patients have many times said to me,—

"I have never felt the same since I took gas. I am much more nervous, and don't sleep as well; have more headache, and would not under any circumstances take it again."

This, it is true, is negative testimony; but have you not all heard the same thing many times in your practice? This position assumed by me is no new one, and it was first recognized twelve years ago by my old and valued friend, Dr. George J. Zeigler. In his little work, "Researches on Nitrous Oxide," p. 49, he says,—

"While, however, the physiological effects of protoxide of nitrogen are usually of a highly pleasurable and sanative character, it cannot, nevertheless, be indiscriminately employed with safety, for the artificial excitement of system rapidly engendered by its free administration may not only prove injurious by directly increasing the tendency to irritation, hemorrhage, and inflammation in the parts subjected to surgical mutilation, but may develop latent physiological tendencies of a different, as well as of a like character in other parts of the body, in persons with certain abnormal predispositions, to such a degree indeed as to seriously injure health, if not absolutely endanger life itself. The precise character and particular manifestation of such tendencies will of course depend upon the special predisposition of the individual system acted upon, but they will necessarily be most likely to appear in certain definite parts of the body, in accordance with the peculiarities of action of the disturbing agent,—nitrous oxide having, as before stated, a marked preference for the blood, brain, nervous system, and genito-urinary organs."

And he further says, in the case of S. P. Sears, of New York, who died two hours after administration of nitrous oxide,—

"It is probable that it hastened death by promoting undue pulmonary congestion;" and of Miss Bell's case, who was taken ill twenty-four hours after administration of gas, and died three days afterwards: "it is quite probable that the excitant influence of nitrous oxide was injurious in so far as it promoted disorder of the brain and spinal marrow."

It may be asserted that if bad results follow the use of nitrous oxide it ought to be easy to prove the same by undoubted testimony, but as a general thing patients actually feel better after its inhalation, and so express themselves in laudatory remarks opposite their names in the book in the operator's office. Does this prove anything? Most assuredly it does, for it indicates continued hyperæmia of nerve centers and cerebrum, which, with the pleasure experienced from the thought that a painless operation had been performed, induces these emotional expressions, and is evidence of abnormal rather than normal conditions; for, as remarked by Dr. Zeigler, "it is a well-known fact that increased functional activity is a primary and constant concomitant of inflammation."

Would physicians be likely to distinguish these unfavorable results? I think not, for the reason that, unless called immediately to treat a morbid condition, they would be apt to lose sight of the primary irritant, and ascribe the difficulty to the operation rather than to the anæsthetic. Again, it may be stated that while nitrous oxide as an anæsthetic has had comparatively no use or investigation by the medical fraternity, and while less is known of the physiological action of this than of any of the other anæsthetics, yet it seems as if they had adopted the (advertised) estimate of its harmlessness, and had advised their patients to take the gas for even insignificant operations, —operations for which they would themselves, if they were to perform them, utterly refuse to administer an anæsthetic. In this belief they "swim with the current,"—how correctly, let investigation determine. In presenting my views, let me say I am actuated by no motives but those which have for their object the public interests, and I will give all the negative testimony which I present to my opponents, and ask only that reasonable positive testimony should be considered as evidence. For the purpose of ascertaining if others besides myself have noticed bad results following the administration of the gas, I have addressed letters to a number of prominent practitioners, medical and dental, asking if they have recognized any morbid conditions, and have received replies which are presented for your consideration, which may be summarized as follows. Several medical men make answer, "We have seen no bad results that we could reasonably attribute to nitrous oxide." Others reply, "We have cases of permanent headache, vertigo, syncope, melancholia, insomnia, epilepsy, cerebral hysteria, and irregular action of the heart, which *patients* attribute to inhalation of nitrous oxide gas, but we as medical practitioners are unable, confidently, to decide upon the primary irritant." The replies of dental practitioners are much the same. They say, "Patients have told us that they considered themselves permanently injured by the use of nitrous oxide."

If, as I believe, nitrous oxide is not an anæsthetic, but like an overdose of alcohol induces cerebral hyperæmia with strong tendency to structural degeneration, is it not time for us to make careful examination of this agent, and, if found dangerous, to hold up our hands in warning to our patrons, whose health, comfort, and lives are so constantly trusted to our professional care and judgment? In presenting this paper, I am actuated by the simple desire to stimulate investigation not alone among dentists, but among medical men who permit their patients to inhale an agent of which they know absolutely nothing.

SOME PHASES OF RIGGS'S DISEASE (SO-CALLED).

BY GEORGE A. MILLS, BALTIMORE.

ARTICLE 3.

NEAR the close of my second article, I was describing the second step of progress, the encroachment of the deposits on the thin edge of the alveolar process, causing it to waste away in the direction of its impingement downwards to the apex of the root or around its circumference. We are accustomed to notice the advance made not only at the localities named in the second article—the proximate sides *particularly* of the inferior incisors and bicuspids—but on the lingual surfaces of the inferior molars. By placing a mouth-mirror to that location and reflecting the light well on it, an examination with an instrument will show the direction in which it is working, which will usually be in an oblique line from the outside edge of the process down to the root of the tooth, forming what may well be termed a crater. In this locality it may waste the entire process to the apex of the root, or the lingual, or in part both the proximate surfaces, and yet the remaining portion of these latter and the buccal may remain wholly intact, in which case the usefulness of the tooth may be preserved for an indefinite time. About the inferior central incisors it is commonly noticed carrying on a rapid destructive work around the entire circumference of the root, with a decided tendency to loosening of the teeth, accompanied by a free discharge of pus, as can be readily demonstrated by pressure of the thumb and finger on the labial and lingual territories. In other cases it will advance more on the labial surface than in any other direction, not uncommonly laying bare that portion of the root to the apex. In other cases it will confine itself to the lingual portions ; here more often banking itself up. When of a yellowish color it is quite easily removed, and may be often detached by a little force from the neck of the tooth in a mass entire, leaving it clear and white ; but as the color grows darker it is more dense and more difficult to remove. It sometimes assumes a cinnamon-brown, black, or green color, each variety exhibiting characteristics peculiar to itself. We find it doing its work on the same general plan on the superior teeth, and it seems to have an inherent disposition to climb, and so it selects the palatal root of the molars, and succeeds in reaching the end, particularly on the palatal side. In many cases I have seen these roots so exposed that it was thought good practice to amputate them, and leave the rest of the tooth to do faithful duty for an indefinite time. There is an expression of this disease which is peculiar, as the deposit is not apparent ; it is generally associated with finely organized teeth. It is indicated by some recession of the soft tissues, often unnoticed by the generality of observers. This phase of the disease is strongly indicated by a marked nodular surface of the gums. When these are pressed upon by the thumb and finger, pus will exude. This condition was first demonstrated to me by Dr. Riggs, while he was giving clinical lectures at the Brooklyn Dental Infirmary six years ago, at which time he proved the efficiency of his method of practice in connection with this disease. I have been writing principally of the milder phases of this disease, which, under the general notice of the practitioner, are spoken of as the effects of tartar; but, as we come to the more advanced stages, it is denominated "gouty diathesis," "scrofula, "old age," etc.; and it is pronounced not amenable to treatment with any hope of a successful result. Thousands of teeth are lost, one by one, without an effort to save them. I do not see any conclusion possible but that the first phases and the last are the same thing, differing only in degree. If the milder cases can be so easily controlled, it is but good sense to acknowledge that the worse ones need not occur. But to prevent them will require more diligence and acute observation than this matter has heretofore generally received. We must be better dental surgeons, physicians, and mechanicians.

In my next article I will refer to some direct consequences, which connect themselves intimately with the vital interests of the general health of the whole body.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the Odontological Society, held at the residence of Dr. E. A. Bogue, No. 29 East Twentieth Street, Tuesday evening, January 16th, 1877.

Vice-President, Benjamin Lord, in the chair.

Incidents of Office Practice.

Dr. S. G. Perry. At one of our recent meetings, Dr. Rich brought forward the subject of saving pieces of rubber dam. The practice in my office, when I have tried to economize its use at all, has been to cut the rubber in strips of three different widths, say four inches for the incisors, six inches for the bicuspids, and eight inches for the molars; and in lengths I should say from twelve to fifteen inches. After the dam has been used the end is cut off just above the holes, and before it gets dry it is thoroughly washed by the assistant, and allowed to dry before being laid away. In that way from the wide strips there will be lost eight inches in width by about four inches in length; from the next, six inches in width by two in length; and from the narrowest four inches by one to one and a half. The strip cut from the widest, however, can be again used on the incisors. It is only a matter of calculation how far a yard of rubber will go. If washed at once under running water the dam can be made thoroughly clean. And yet for fastidious patients I prefer to cut it from the piece in their presence, and send it to be washed that there may be even no suspicion of its having been used.

Dr. A. H. Brockway. I had an unpleasant experience this afternoon, although not so unpleasant for me as for my patient. It was simply that I caught one or two hairs of a gentleman's moustache in a corundum wheel, from which we both received quite a shock. It is my first experience of the kind, and I have often wondered why such accidents do not happen oftener. Had the rubber dam been on at the time the accident could not have occurred.

Dr. E. A. Bogue. I had an experience on Christmas day that set me thinking. One of our brother-dentists got hold of me and went to work at a tender spot in my tooth. He put in something that he said was "Extract of Chicago Horseradish." After returning home, I took some oil of peppermint and added twice as much sulphuric ether, in which had been dissolved to saturation salicylic acid, and from that time I have been using it for sensitive dentine. As far as I could, I have used the Chicago preparation and this side by side in the same mouths, and the patients, without knowing anything about either, have in every instance pronounced in favor of this. The recipe is therefore given.

In addition, I had a curious case of office practice. A gentleman came to me with a lower molar split in three pieces. After getting the pieces tolerably well together, I kept them there by a swaged cap, which fitted the molar exactly. I first put a gutta-percha filling in the pulp-chamber as a covering for the soft parts, as the gum was exposed through the fracture, filled the roots with oxychloride, and then put the cap on with oxychloride of zinc; it has now served for masticating purposes for some time with entire comfort.

Dr. J. W. Clowes. One of the most mysterious things to me in the practice of dentistry is shown in the failures that so often occur in the case of one dentist operating for another. I have within a year been in the hands of two dentists who are considered first-rate, but they have not succeeded in filling a tooth for me. I have had several teeth operated upon, and one I have had five dentists at, and they have spoiled it. It is a singular thing that when a dentist gets into the hands of a brother-dentist he gets his teeth ruined.

I have tried to be an exception to this rule. But a year or two ago a brother-dentist came to see me, and we were talking about the proper way of filling cavities, roots, and so on. I told him how it should be done, how I did it, etc., and how I succeeded without an exception. He had a tooth which was in a pretty bad condition, and I put him into the chair and filled it in my approved fashion; but I had no sooner got the filling in than such a disturbance was created that there was no peace until I took the filling out again. Yet I had pursued the same course in other cases month after month, and there was no such thing as a failure.

The President. What do you fill the pulp-cavity with?

Dr. Clowes. Always with osteo-plastic. That is *the* thing, as I understand it, and there is nothing better. It acts as a disinfectant, and is an excellent filling for the root.

Dr. Chas. Miller. I think Dr. Clowes got into the same difficulty that I did once. A lady called upon me who had a tooth into the root of which had been put some cotton. I removed the filling and applied some of the chloride of zinc, as Dr. Clowes recommended, and it made such a disturbance that I have never used it since. When I have used carbolic acid, and afterwards chloride of zinc and then oxychloride, I never have had difficulty. The first application to the root of this lady I am satisfied went through the foramen.

Dr. S. G. Perry. Does Dr. Clowes know whether he left any of the dead pulp in the tooth which gave trouble? Did he clean the root thoroughly and fill to the apex by exact measurement?

Dr. J. W. Clowes. I think there was some of the dead nerve there in a liquid state, and that is the way I accounted in my own mind for the trouble.

Dr. S. G. Perry. In your method of filling roots with oxychloride alone, what becomes of the air that is carried before the oxychloride?

Dr. J. W. Clowes. I am sure I don't know. I apply it by putting in very little at first. I have pellets of paper of different sizes and instruments of different diameters. I press a small pellet away down near to the point, and then I take a small hook and take out that pellet; then I apply a little more with an instrument a little more blunt, and so on by degrees. I do not put it all in at once, because there would be a flood of air carried in.

Dr. S. G. Perry. I should expect to have no trouble by using a few fibers of cotton, but I should without, no matter what the instrument or how carefully I used it.

The secretary read the following paper, entitled "The Transplantation and Replantation of Teeth," by S. P. Cutler, M.D., D.D.S., of Memphis, Tennessee:

This subject is not new, for it was known and practiced by the earlier dentists of the century with variable success and, at one time, great popularity. It became for a time almost obsolete, but has been of late and in some measure revived. However, while many may indorse the expediency of occasionally replanting, few, if any, will be in favor of transplanting from one mouth to another, as formerly so much practiced.

This paper will be chiefly confined to the consideration of the transplantation of old, waste teeth lying about the dental office. This subject is worthy of deeper research than has been accorded it before arriving at a definite conclusion as to its merits. Recent facts coming to my knowledge have led me to investigate it more thoroughly than ever before.

Cases in Point.

1. A second superior bicuspid, which had been transplanted six months previously, was shown to me. Owing to some pain in the jaw above the tooth it was extracted, though firm in the socket. The surface of a large portion of the root was covered with a bony deposit, apparently cementum, which corresponded in thickness with the inter-alveolar membrane. This deposit, not entirely confluent, was wanting over the end of the root, where it had been polished smoothly. A section of this deposit, under the microscope, showed true bone-structure in lacunæ and canaliculi.

The first bicuspid adjoining had been also transplanted at the same time. This was left in position. These were old, waste teeth. The patient was a man thirty-five years of age and of good constitution. The extraction required unusual force.

2. I was lately shown, in the mouth of a lady twenty-three years old, a first superior bicuspid which had been inserted by transplantation in February last. This tooth was firmer than any other in her mouth, for it could not be moved or shaken in the least degree. The tooth extracted had two roots, which broke in extraction and had to be drilled out, together with the plug of bone between them. The inner border of the alveolus was also fractured, and came away four weeks afterward; after which time the transplanted tooth became firm in the socket, with no after-trouble. The alveolus is now perfectly restored and natural.

3. A gentleman, fifty-five years old, had the lateral left superior incisor transplanted three months ago. This tooth has occasioned no disturbance from the first, and has been used equally with the others. It is firmer than any other in his mouth, with no signs of disease about it. It was an old tooth which had been drawn several years.

The left central was dead and filled. The right central had been transplanted on the day I saw the case, and was fastened with a fine wire. I have since learned that this last transplantation is a success. The gentleman's temperament is bilious; constitution sound.

4. A young lady, sixteen years old, had the first superior bicuspid transplanted three months ago. The tooth removed, I was told, had three small roots, and the plug of bone was drilled out to make room for a tooth with a single root. This tooth is not yet very firm, though improving. I think the probability of success rather doubtful.

5. A gentleman, about thirty years old, had the right central superior incisor transplanted about four weeks ago. This tooth is becoming

quite firm, giving no trouble, and looks well. It was an old tooth. The case will be, I think, a success.

6. A lady, about twenty years old, had the right central incisor transplanted three years ago. The transplanted tooth was an old one, having been out several years. It is perfectly firm, and has been useful and occasioned no trouble in that time. The lady is of small stature, nervous temperament, and apparently healthy. The above six cases have been shown to me within the last six months by a dentist of Memphis.

Personal Experience in Replantation.

1. Some twenty years ago I extracted the only superior molar of one side (the second molar). This tooth having three long, straight roots, the case seemed a favorable one for replantation; accordingly, with the consent of the patient, I replaced it, having to use considerable force in the operation. This tooth remained firm, and has been useful. Circumstances prevented my having an opportunity to fill it.

2. A man in the country, while extracting one of the superior bicuspids for his wife, through a slipping of the forceps, extracted the other, a sound tooth, also. This he immediately replaced, and afterwards put the lady under my care. The tooth gave her no trouble, and is to-day a good tooth. The lady is of a scrofulous cast and lymphatic temperament, though healthy. She has many decayed teeth.

3. About twelve months ago I extracted the right lower second bicuspid for a lady twenty years old. The root being long and straight, I advised its return to the socket, and it was soon after replaced, considerable force being required. From taking cold in a short time, the gums became swollen and painful. About four weeks afterwards, I extracted the tooth the second time, some force being necessary. On one side there was a small patch of bone, firmly adherent, and also some soft tissue. This bone, under the microscope, showed true bone-structure in lacunæ. The canaliculi were not quite perfected, owing to want of proper time for their formation. The temperament of the patient is sanguine, and the constitution sound. She is a house-servant.

4. A celebrated Japanese athlete, who was in the habit of supporting a weight of two thousand pounds upon a plank held between his teeth, had, by some accident, all his upper front teeth and jaw-bone broken loose. He was treated and cured, so stated. I saw him perform the feat in New Orleans five years ago.

Transplantation.

In *Johnston's Dental Miscellany* for September, 1876, there is a history of the replanting and transplanting of teeth from the time of

Ambrose Paré (who died in 1590) to the present. The same article also appears in the *Dental Register* for November, 1876. The following are extracts:

"Thomas Berdmore, surgeon dentist to George III., King of England, said, 'The surgeon's art has taught that a tooth which has been partially or totally forced out of its socket may be again restored to its former situation and firmness, and may serve for use and armament to the latest period of life.' And further, 'In the most favorable circumstances it is more than an equal chance that a tooth once extracted or beat out, it will fasten again.'

"In a work published in 1778 by Robert Wooffendale, a practical dentist, there is a more circumstantial detail of the mode in which teeth are to be transplanted, and of the uncertainties attending the undertaking. He speaks of the operation as being very desirable when it succeeds, and thinks the success depends greatly on chance, and on the shape, size, and adaptation of the tooth.

"John Hunter was in favor of the process. He thought the transplanted tooth should be rather smaller in the root than the one removed. 'If too large it may be reduced in size, and will answer as well.' He says the socket grows to the tooth. He also thinks that if a live tooth be transplanted into the flesh of an animal, the vessels of the part will unite with the vessels of the tooth. He transplanted a tooth into the comb of a common fowl, and believed that the vessels had united, and that the coloring matter of the comb had injected the vessels of the pulp."

There certainly must have been some error in this statement, since the vessels, where they enter the foramen of the root, are so minute that no injection could enter the pulp even if intact. Hunter must have been mistaken. It is true that coloring matter forced into an empty pulp-chamber may be taken up by the tooth-substance, through osmosis, so as to color the tooth.

"Joseph Fox, an eminent dentist, in his 'Natural History of the Teeth,' published in 1814, says, 'The ill success and unfortunate consequences that have sometimes occürred have caused the practice to be abandoned for many years past.'

"Lefoule, a distinguished dentist of Paris, denounces transplantation because of the 'selfishness of the rich, who would deprive the poor of their teeth to replace their own.'

"In a work published in 1774 by M. Patence, a dentist of London, there is the following: 'Of late it has been the practice to extract a tooth from the mouth of some poor person and transplant it into the socket of another for a few shillings.' Also, 'It has been asserted by a dentist that, by means of a process known only to himself, he could transplant teeth that had been extracted from the mouth any length of time, even after they had been carried in his pocket until the roots were worn to a polish. His statements aroused the incredulity of almost every one.' This author says transplantation may be effected in the following manner: 'Take a tooth from a skull, or one which has been out for some time, lay it in water for three months, so that it may open the pores, then place it in hot water for three hours, then bind it in the socket with silk to the other tooth.'"

The practice of transplanting the teeth of animals, which was once in vogue to some extent, is not mentioned in the above paper.

We thus discover that, one hundred years ago, the idea of utilizing old waste teeth in transplantation was advanced. The practice, become obsolete, is being now revived and modernized, with more light of knowledge and experience, and, consequently, with greater success. It is an advance in the right direction, if not abused. A piece of bone, or ivory, fashioned to fit the empty socket, might grow there in the same manner as an old tooth. Why not?

Transplanted Teeth.

The *rationale* of the process of growth after transplantation appears to me to be about as follows:

When a tooth is removed from the socket there is a solution of continuity similar to that of a broken bone, and a process of restoration is then commenced. When a bone is fractured, there is improvised from plastic lymph, within twelve or fourteen days, a connective-tissue matrix, to serve as a cartilage for ossification, which commences about the time specified. In the course of a week after, the callus becomes quite firm, and in thirty days from the time of the accident (generally) the bone has, if properly adjusted, become knit together, although perfect union cannot so soon take place, the time for such union varying in different subjects from one to two years, more or less. The periosteum is mainly concerned in the above work.

In the cavity whence a tooth has been drawn a similar process ensues. The cavity must fill up at the bottom, while the alveolar border must waste away,—the process being a double one, in waste and reproduction. This process is chiefly accomplished by the alveolar membrane; first, by improvising a matrix of plastic material at the bottom of the cavity, which, in about two weeks, begins to fill up with lime, and ossification goes on about in the same manner as in the case of fractured bone. An external table of bone is then formed over the point, when the process may be regarded as complete, the gum afterward forming a true periosteum.

The lining membrane of the alveolus, in the first period of tooth-formation, develops the cementum on the one hand and the alveolus on the other, thus carrying on a dual process. When a tooth is transplanted into an empty socket the normal process of restoration is obstructed, the foreign body preventing the filling up and wasting process of the alveolus. In such a case, Nature does the best she can by filling up such spaces as are not occupied by the intruding body. As in the case of a broken bone, there takes place a deposit of lime-salts and ossification around the root and into the alveolar membrane, the deposit adhering firmly to the root by some law of atomic polarity of the lime molecules as yet not fully understood. Thus the lime-salts become firmly adherent to the implanted root by some process of electric affinity, while at the same time the membrane ossifies. Thus is established a more or less complete anchylosis of the tooth and the jaw, in a manner similar to some cases of cementosis, where the crusta petrosa and alveolus become united and converted into a solid mass. Such cases are often seen.

As to the supposition of any union of nerves or blood-vessels ever taking place (though the tooth be replaced immediately), I take the liberty of denying it *in toto*. Such a thing cannot occur, notwithstanding there are those who think it possible.

There is no difference, as regards the final results, whether a tooth has been out of the socket five minutes or five years. The only circumstance that can affect those results is adaptation. If a transplanted tooth does not entirely fill the socket, an extra filling up must take place.

The most critical period of the process is from the twelfth to the thirtieth day, as in the case of a broken bone,—absence of motion being essential to complete success in either case.

In one case a foreign body is introduced, demanding vital association. Whether that foreign body be the tooth just removed, or one lying about the office, is the same thing as regards principles and results. It is in favor of a replanted tooth that it may fit the socket more accurately than an old one. In the other case homogeneous living bones are in contact, though broken in two.

In both instances the process of repair is much the same so far as bony deposits are concerned. The new bony deposit hardens by absorption of the more fluid matters as atomic cohesion progresses among the deposits of lime molecules in the matrix cells.

I call a tooth a foreign body as soon as it has left the socket (even if immediately replaced), because it no longer holds any vital connection with the alveolus. The dead line must be established somewhere. There is no vital connection even with the pericementum, which should be removed. When the nerve in a tooth is killed, that tooth is not so much a foreign body as a replanted one, though the dead line exists in both cases.

In a dead tooth there is no longer any growth of cementum, or any lime-deposits in the alveolus, except in some cases where an abscess at the end of the root may fill up with bony deposit after the breaking up of the morbid deposit. I state this as the result of long and close observation.

In some cases of persistent abscesses about the roots of dead teeth a cure may be most speedily effected by replantation. Such cases have lately been reported.

The process of bone repair, now under discussion, may be regarded as union by first intention (if successful), as in flesh wounds.

Again, when a tooth is removed from its socket a repair by first intention follows, in dual process,—a building up and taking down, an advance and retrograde movement, corresponding to the simultaneous shedding and eruption of the first and second sets of teeth. But when a tooth is transplanted into an empty socket the normal process is somewhat disturbed, the wasting process being arrested; the filling up of any vacancy then occurs, and finally the membrane itself ossifies. This process may be also a healing by first intention, equally as when no tooth is implanted, or as in the case of a broken bone.

The probability of after-trouble in the case of a transplanted tooth is not so great as in cases of dead teeth which remain in their sockets, as there is, in the first case, no longer any membrane left to experience subacute inflammation. This is the cause of special dread in the latter cases.

A transplanted tooth, after becoming firm in its socket, is no longer a cause of irritation, since it is bone against bone, without the intervening membrane which causes so much trouble in the case of dead teeth.

In some instances where failures occur no osteoplastic inflammation takes place, but on the contrary, a process sets in which results in wasting of the alveolus and expulsion of the transplanted tooth. Then healing by second intention follows, as in cases where no transplantation had taken place. In favorable cases of transplanted teeth very little inflammation or soreness follows; only enough occurs to cause a precipitation of lime-salts from the circulation in the membrane or periosteum.

Inflammations in fleshy tissues have three modes of termination, *i.e.*, resolution, suppuration, and gangrene, or death of the part and sloughing. Injuries and diseases of bones do not differ essentially from those of the flesh. Traumatic injuries of bones, as in cases of broken bones and tooth-extractions, terminate by secretion or transudation of germinal matter, and then precipitation of lime-salts and ossification, which may be regarded as healing by first intention or resolution. When suppuration ensues, the process runs into a subacute state and retarded restoration, or healing by second intention. In still more aggravated cases, necrosis and sloughing follow.

When a tooth-pulp becomes inflamed, it either suppurates and dies or ends in resolution as other flesh. In other cases of irritation and stasis, not quite amounting to inflammation, lime-salts are precipitated from the blood, and ossification (in some cases nodules) in the pulp results,—ossification corresponding to vital weakening as a rule.

In the one case we have suppuration; in the other, precipitations of lime-salts, and then resolution.

Opposed to the root of a transplanted tooth there is a surface of live bone without any periosteum. Still, the bone remains healthy by some law of accommodation not apparent in any other case. On the contrary, in the case of a dead tooth remaining in the mouth, there is a periosteal membrane with a circulation of blood to sustain the internal alveolus. The opposite side of this membrane is attached to the dead cementum, where, of course, vital resistance is greatly weakened; and here, in these cases, is a point of great danger.

In conclusion, I do not wish to be regarded as the advocate of a system of indiscriminate transplanting or replanting. On the contrary, I would recommend it only in exceptional cases, and these determined with great care and judgment. Should they be approached otherwise, the inexperienced practitioner will "come to grief." A considerable number of failures, even under the most judicious and experienced management, may be counted on. Age, temperament, family tendency to certain diseases, habits, occupations, and personal peculiarities, should all be carefully examined. Even under such cautious scrutiny failures will be frequent,—to the extent, at least, of one in four or five cases.

(To be continued.)

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

The regular monthly meeting of the above society was held at the hall of the Pennsylvania Dental College, on Tuesday evening, February 13th, President Robert Huey in the chair. The routine business being disposed of, Prof. G. T. Barker read a paper on the "Abuse of Nitrous Oxide Gas."

The following discussion ensued.

Prof. Barker moved that all strangers present should have the privilege of debate. So ordered.

Dr. J. D. Thomas thanked the association for the privilege accorded him to discuss the paper of Prof. Barker. He admitted that nitrous oxide was used for mercenary ends by some, and that many valuable teeth were sacrificed that might be saved by proper treatment. He believed that nitrous oxide could be administered with safety. He had known of cases where thirty gallons were administered to one patient without obtaining anæsthetic effect. He believed, however, that the gas could not be administered in such quantity if pure. Dr. Barker, in his work on nitrous oxide (1866), said that old gas was as good as fresh. It had not been his experience to verify this, and Dr. Barker was responsible for many bad results. By fresh gas he meant gas made one day to be administered the next. Prof. Rand advocated the efficacy of old gas; but he had found that when gas was more than a week old it was inefficient. In proof of this a gentleman had taken at his office seven inhalations of gas a week old with scarcely any effect, while three inhalations of fresh gas affected him almost to unconsciousness. As for perfectly pure gas, he does not think there is one in fifty who knows when he has pure gas. He has never known any patient to be injuriously affected by the gas. A little nausea is sometimes felt; but this passes off almost before leaving his office; and even in these cases he has only observed it in persons who are easily affected at the sight of blood. He differs with Dr. Barker as to the evanescent effect of the gas, holding that one skilled in its administration and management has an abundance of time to extract any ordinary tooth; and extra-ordinary ones indicate difficulty, and are dealt with by those means by which alone they can be dislodged, viz., by grasping the alveolar process along with the stubborn root or tooth. He has seen cases where other anæsthetics were administered, and the parts fearfully lacerated. Dr. Thomas here referred to the cases alluded to in Dr. Barker's paper. He said that when the case presented he advised the patient to return to Dr. Barker to have the tooth treated. She returned with her family physician, who desired him to extract it. He again refused, and told her to return to her dentist, who was the best judge of the case. She still persisted, and, yielding at last to her repeated entreaties, he extracted the tooth.

Prof. E. T. Darby rose, not to discuss the paper, but to give his testimony to the exercise of the prudence which he had always observed on the part of Dr. J. D. Thomas, and also by his late brother. He could testify as to considerable discrimination exercised by these gentlemen, not only in the proper administration of nitrous oxide gas, but also in the extraction of teeth. He believes their motives were higher than those of mere gain. He knows of these gentlemen having made inquiry of persons coming to them to have teeth extracted as to their dentist, and of their advising them against the extraction of teeth which they felt could be saved, and knows, too, of their refusal to extract teeth that they felt could be treated and made serviceable.*

Prof. T. L. Buckingham hoped the discussion would not drift from the topic. He had used nitrous oxide in his practice, but he must confess that he had not discovered any difference between old and fresh gas. Chemically, he believed no difference existed. He had been told by Dr. Sprague that he had used it when six months old. Sansom, in his work on chloroform, relates of two young girls, one in full health, the other just recovering from a case of typhoid fever, who attempted suicide by inhaling the fumes of carbonic acid from burning charcoal. The one in full health died from the effects of the gas, the other recovered. A canary-bird was placed in atmosphere partly composed of carbonic acid until it was nearly asphyxiated; he then introduced another canary-bird into the same gas, and the bird last introduced died first, showing that when there is a sudden change from a normal condition there is a greater danger than when the change is more gradual.

For his part his experience with nitrous oxide was but limited, and to tell the truth he was afraid of it, so that he felt himself much obliged to Dr. Thomas for taking a disagreeable duty off his hands.

Prof. Barker said that Dr. Thomas and his brother had instructed the people that there was no danger in taking the gas, so that now people wanted it for the most trivial operation. Parents even brought children to him to have his consent to the removal of deciduous teeth with the gas, and now there is scarcely any one who will submit to the extraction of a tooth without gas. He believed this wrong, as he felt there was danger of ill effects from the inhalation of the gas which might not show themselves immediately, but might be felt for a long time after, and it may be through life, to say nothing of the wholesale slaughter of valuable teeth by unscrupulous, mercenary men. As for old gas and new, he held that the old was better, because it was purified by standing over water which absorbed its impurities, if any were present. The reason the fresh gas acts quicker is because of the presence of free ammonia and nitric acid fumes, which may induce quicker anæsthesia. He cannot exonerate the nitrous oxide men for extracting teeth merely on the will of the patient, nor on the consent or counsel of their medical advisers, as he conceives that neither the one nor the other knows anything about the true indications. As to the patient's teeth being her own, and she being a free agent, will you find a surgeon amputating a finger with whitlow merely because the patient says her hand is her own and she can do what she likes with it? He knows of cases of ladies who have never been well since they took nitrous oxide gas at the hands of Dr. Thomas. As for medical men, they know nothing about the diseases of the teeth. He does not care how many teeth Dr. Thomas extracts if they ought to be extracted, but he does not admit that he has the right to take out *one tooth* that can be retained. When the veins become engorged with blood, the face blue, and convulsive twitchings come on, he held that the subject was nearer the grave than we have any right to place one merely for the operation of teeth-extracting.

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* The discussion here took a turn as to ethics rather than upon the subject of the paper.—REPORTER.

Dr. Peirce desired to say a word on this subject. He has not had much experience, but has been more successful with old gas than with fresh. He referred to the influence of the gas on patients, and to the case of a physician who claimed that it had a very pernicious effect on him; that he had never been well since he took the gas, and had been confined to the house for a time, and had observed large quantities of sugar deposited from his urine; he had lost considerable flesh, and had to refrain from all food of a starchy nature, living almost entirely on milk and eggs. For himself, he has not the least doubt that people have been seriously injured by it, yet there are many who do not complain of any ill effects. He must believe that Dr. Thomas was wrong in yielding to the solicitation of his patient and extracting the tooth when such operation was contrary to his own judgment. He should have refused, and let her go to some one else, if she were determined to have the tooth extracted. Dr. Peirce related being present in a physician's office when a hearty man came in and requested to be bled, whereupon the physician bled him. When the man left the office he asked the physician why he bled the man, and his answer was that he had asked to be bled, and he bled him. Patients are not to be supposed to have correct ideas as to what operations are demanded or are likely to prove beneficial to them. No dentist ought to allow his judgment to be influenced by the desire of the patient. The experience of every operator proves that subjective sensations are extremely unreliable and should not be made the justification for an operation involving the loss of a tooth.

Prof. J. H. McQuillen had listened attentively and with interest to the paper of Dr. Barker. He had imbibed originally a strong dislike to the use of nitrous oxide gas, on account of the manner in which it had been introduced into the city by Colton. Its skillful and conscientious administration at the hands of Drs. Frank and J. D. Thomas had, however, won his confidence and respect, and of the many patients he had taken or sent to them, had yet to hear of a single case in which any ill effects had attended or followed the use of the agent. He knew of repeated instances in which

Dr. Thomas had refused to extract teeth that could be saved. In the case of extraction for one of his patients, he not only exonerated the gentleman from all blame in the matter, but in addition thanked him for relieving the lady of a tooth that had been a repeated source of trouble to her long before she came under his (Dr. McQ.'s) care, and in this instance was aggravating nervous prostration of the entire system. He did not regard the opinion of a medical man as entitled to much consideration with regard to the question of the extraction or retention of a tooth. He could recognize, however, the possibility of a case in which a tooth, valuable as it might be, would be as nothing in comparison with the shock to the system from prolonged pain attendant upon its retention. Of all the anæsthetics in use, nitrous oxide gas in his opinion was the least dangerous; at the same time he recognized that in incompetent hands it might become the source of incalculable injury. In the cases reported this evening in which serious derangement of the system was attributed directly to the use of the nitrous oxide gas, he was free to confess that the evidence presented did not to his mind warrant the emphatic conclusions arrived at. There may have been other and unrecognized causes at work as all-important factors of the trouble named. Scientific men who know how easy it is to be mistaken, particularly in questions directed to the relations of cause and effect, are cautious in expressing an opinion. The non-committal letters from Drs. S. Weir Mitchell and Da Costa read to us are evidence of that fact. The case of diabetes attributed to a single administration of nitrous oxide gas was, in his opinion, an open question. What is diabetes? One of the important functions of the liver is the constant formation of sugar, the normal production meeting the needs of the economy; but it is sometimes formed in excess and is carried out of the system through the kidneys with an increased flow of urine. This constitutes diabetes. Is it reasonable to infer that nitrous oxide gas, single and alone, could produce this? Is it not more than probable that other influences were at work? Dr. Barker had claimed that nitrous oxide gas was not an *anæsthetic*, and said its influence was merely due to cerebral hyperæmia. What is an anæsthetic? An agent that renders a person under its influence insensible to pain. Nitrous oxide gas does this most effectually, not only producing *anæsthesia*, or loss of sensibility, but *narcosis*, complete unconsciousness.

He then directed attention to the two theories entertained with regard to the manner in which anæsthetics produce their effect. One theory is that they act upon the nerve centers as a direct poison, being carried there by the circulation. The second theory is that the anæsthetics interfere with respiration, and hence anæsthesia or narcosis is due to privity of oxygen.

Prof. T. C. Stellwagen. The question was not only to be answered for Philadelphia or Pennsylvania, but for the whole world. We must learn to look at this agent as a two-edged sword, and to use it carefully. If old men in the profession are apprehensive about it, the young should be the more careful, for it is a dangerous remedy if used unduly. As to the gas, he thinks the old is better than the fresh, because by standing over water this absorbs any nitric oxide or impurity that may have passed over in the process of manufacture. He does not think teeth are like warts or corns, to be cut off or extracted, but their preservation should be entrusted to skillful practitioners. It has been said, "If thine eye offend thee," etc., but teeth that offend should be rendered comfortable and not ruthlessly extracted. Dr. S. related a case in point of a lady. If we administer nitrous acid at a time of any particularly susceptible condition of the system, it may produce ill effects from its changing the equilibrium or distribution of the blood. Notwithstanding the danger attendant on the use of anæsthetics he regarded them great boons, and although having had a critical experience with his own wife, he would still never hesitate to administer when he thought it indicated. We should discriminate cases, and for cases of simple extraction he believes it should not be used as freely as it is. It is better to persuade the patient to submit than allow the use of the gas on every occasion. If we encourage the indiscriminate use of nitrous oxide gas we encourage cowardice. Dr. S. related how, by cultivating the reliance of the patient in the operator's willingness to stop at any step in extraction, he seldom failed to obtain such influence as to have them eventually submit to the operation without anæsthesia.

Dr. Buckingham must differ with Dr. Barker as to the nitrate of ammonia. He doubted if one could inhale the deutoxyd of nitrogen; it would irritate the trachea all the way down. If the gas should contain free chlorine this would produce inflammation of the fauces. He had asked Mr. Johnson, of New York, what were the impurities in nitrous oxide gas, but he had not told him. He thought the gas did not give oxygen to the blood. If it did furnish oxygen to the blood, why this blue color in the face and lips when it was inhaled? The gas evidently produced some specific effect. He thought it may have been instrumental in producing diabetes or scarlet fever by putting the system in a condition that these effects were brought about, or by affecting the system in such a way that these conditions were hastened or incited. Let us endeavor to find out if it can produce these effects. It is a very important subject, and one we should ponder well, whether we should incur these risks for so trivial an operation as the removal of a tooth.

Prof. Remington, College of Pharmacy, could not see how impurities could creep into nitrous oxide gas, especially in the use of "fused nitrate of ammonia" for its manufacture. He had once been employed in the establishment of Powers & Weightman, and knew they used every precaution in the production of a pure article. He thought impurities might be caused by improper washing, and questioned Dr. Thomas on this point.

Dr. Thomas related three cases where the gas had successively exhibited a depressing effect on three patients one after another. This being an unusual result with it in his experience, he tested the gas and found "chlorine" present. He immediately sent to Messrs. Powers & Weightman to complain of the nitrate of ammonia, when they explained that the substance had a strong affinity for chlorine, and as at the time of its manufacture they were manufacturing chlorides in an adjoining room, they accounted for its presence in the liberation of the chlorine and its absorption by the nitrate of ammonia from the atmosphere. He tests his gas with nitrate of silver, and has little faith in the wash-bottles.

Prof. Remington spoke of using warm instead of cold water in the wash-bottles for purifying, and thought the gas was frequently generated so rapidly as not to be purified in its passage through the wash-bottles.

Prof. Barker said it was a popular error that the commercial nitrate of ammonia contained any deleterious compounds; most of the nitrate of ammonia found in the United States was the product of three prominent manufacturers of chemicals, and he had on several occasions tested samples of each for his class lectures, and found them equally pure; as they all contained as an impurity a slight excess of nitric acid, the substance was not therefore as it should be, a neutral salt; but in the preparation of the gas the water in the wash-bottles or in the receiver would absorb the free nitric acid, and hence, as before stated, fresh gas was not suitable for inhalation until allowed to stand over water. If the position assumed by Prof. McQuillen was a correct one, viz., that nitrous oxide was an anæsthetic because it produced narcosis, then other agents, as alcohol, opium and its compounds, aconite, belladonna, Indian hemp, and hosts of other substances, could be justly classed as anæsthetics, as they certainly produce insensibility. He regarded those substances only as anæsthetics which, being vaporized and used judiciously and carefully, enter the lungs in a gaseous state, and by osmotic action pass into the circulation, and while suspending nutrient action in the remote capillaries did *not* destroy organic life or produce dangerous metamorphosis of organized structures. It has been asserted by Dr. Thomas that nitrous oxide is not a dangerous gas; he asked the members of the association to follow him in the prominent symptoms step by step. First, it is usual for a patient to take only two or three inhalations before there is marked evidence of vascular excitement, action of heart increased, and violent respiratory efforts. These symptoms are not seen to any such extent with ether or chloroform, and they indicate absence of oxygen in the lungs and disturbance of the equilibrium of the circulation so happily referred to by Prof. Stellwagen. They also indicate that the heart recognizes the presence of a powerful irritant in the blood, and under its stimulus this fluid is forced with great rapidity into the carotids, from thence to the brain, distending the capillaries there, and inducing that condition to which he (Prof. B.) referred in his paper as cerebral hyperæmia. As a consequence of this condition, metamorphic changes occur with such rapidity and to such an extent in the brain that the veins are charged with discolored or carbonized blood, and the face presents the dreadful blue appearance which shocks not only the attendant of the patient narcotized, but the intelligent surgeon. He would ask, if nitrous oxide does produce this engorgement of capillary vessels of the brain, what changes are liable to ensue from such a morbid condition? and would answer, congested vessels may relieve themselves in one of two ways, either by transudation of serum or watery constituents of the blood through the coats of the vessels into the brain-structure, or by the rupture of vessels and formation of clot or clots in the brain-substance. It may be asserted if this occurred death would at once result; but would answer that this might not be the result if such effusions were limited in quantity or size, but it would certainly give rise to and account for the morbid conditions to which he referred in his paper, viz.,—epilepsy, melancholia, insomnia, irregular action of heart, etc. If it is admitted that these powerful systemic influences can be induced without danger with nitrous oxide, then it may be asserted that it stands alone in the materia medica in its physiological action; for while any such approximating symptoms are induced with *any* other agent death is regarded as impending, and the intelligent efforts of the surgeon must be immediately, persistently, and actively directed to ward off a fatal result.

Dr. Barker said he could well understand how a system weakened by inhalation of an irritant gas, acting as an exciting cause, could develop an existing predisposing disease in the patient, establishing perhaps scarlet fever, when such germs were in the atmosphere inhaled, or a diabetic tendency in the liver and kidneys if the diathesis existed.

The meeting, at a late hour, then adjourned.

VERMONT STATE DENTAL SOCIETY.

The members of the dental profession of Vermont, having long felt the need of a State organization that would enable them to keep pace with their professional brethren in other States and engender a harmonious feeling of brotherhood among the profession, better uniting them in sympathy of thought and action, met at the Pavilion Hotel, Montpelier, Wednesday, March 21st, to take suitable action relative to forming a State dental association.

The convention organized under the name of the Vermont State Dental Society. A constitution, by-laws, and code of ethics were adopted, and the following-named gentlemen elected officers of the society for the ensuing year:

President.—Dr. James Lewis, of Burlington.

First Vice-President.—Dr. Jos. L. Perkins, of St. Johnsbury.

Second Vice-President.—Dr. L. Gilman, of St. Albans.

Third Vice-President.—Dr. H. A. Baker, of Woodstock.

Secretary.—Dr. Chas. D. Newell, of St. Johnsbury.

Treasurer.—Dr. O. P. Forbush, of Montpelier.

Executive Committee.—Dr. C. R. Pell, of Montpelier; Dr. L. T. Lawton, of Rutland; Dr. S. D. Hodge, of Burlington.

After the hearing of essays and discussions, the society adjourned to meet at Burlington the first Wednesday of September next, at 7 o'clock, P.M.

The meeting was well attended, showing that the dentists of the State are well aware of the value of professional intercourse.

Chas. D. Newell, *Secretary.*

OHIO COLLEGE OF DENTAL SURGERY.

The thirty-first annual commencement of the Ohio College of Dental Surgery was held in the lecture hall of the college, Cincinnati, Wednesday evening, March 7th, 1877.

The annual address was delivered by E. J. Waye, of Sandusky, Ohio; the address to the graduates by Prof. James Taylor, President of the Board of Trustees.

The degree of D.D.S. was conferred upon the following graduates by Prof. Taylor:

A. L. Brown, Cincinnati; T. B. Holderfield, New Richmond, Ohio; James McCampbell, Cedarville, Ohio; T. H. N. Smith, Maysville, Kentucky; W. J. Walker, Franklin, Kentucky; J. B. Wirt, Lexington, Kentucky.

NEW ORLEANS DENTAL COLLEGE.

We are informed by Prof. A. F. McLain that, owing to the fact of there being but one candidate for graduation, no commencement exercises were held.

The number of matriculates for the session was four.

The degree of D.D.S. was awarded to Frank B. Owen, Texas. Subject of thesis, "Alveolar Abscesses."

DENTAL DEPARTMENT, UNIVERSITY OF MICHIGAN.

The second annual commencement of the Dental College of the University of Michigan was held on the 28th of March, when the degree of Doctor of Dental Surgery was conferred upon the following-named gentlemen, viz.: M. Holland, St. Joseph, Michigan; Wm. G. Stowell, Manchester, Michigan; P. J. Kester, Chicago, Illinois; P. McGregor, Ann Arbor, Michigan; H. V. Jackson, Ann Arbor, Michigan; G. W. Irwin, Lima, Ohio; Geo. S. Shattuck, Belle Plaine, Iowa; S. B. Hartman, Fort Wayne, Indiana.

The address to the class was delivered by Dr. A. T. Metcalf, of Kalamazoo, Michigan.

MERRIMACK VALLEY DENTAL ASSOCIATION.

The fourteenth semi-annual meeting of the Merrimack Valley Dental Association will be held at Concert Hall, No. 100 Market Street, Lynn, Massachusetts, Thursday and Friday, May 3d and 4th, 1877, commencing at 11 A.M. on Thursday.

W. E. Riggs, *Secretary.*

ILLINOIS STATE DENTAL SOCIETY.

The thirteenth annual meeting of the Illinois State Dental Society will be held in the "Old Supreme Court Room," Springfield, Illinois, commencing on Tuesday, May 8th, 1877, at 10 o'clock A.M.

E. D. Swain, *Secretary.*

IOWA STATE DENTAL SOCIETY.

The fifteenth annual meeting of the Iowa State Dental Society will be held at Des Moines, commencing on the first Tuesday in May, 1877, at 10 o'clock, A.M. John Rix, *Corresponding Secretary.*

GEORGIA STATE DENTAL SOCIETY.

The ninth annual meeting of this society will be held in Macon, Georgia, commencing Tuesday, May 8th, 1877.

M. S. Jobson, *Corresponding Secretary.*

EDITORIAL.

BOSTON DENTAL COLLEGE.

We are requested to state that the number of matriculates for the session just closed, was thirty-four, instead of thirty-two as represented.

DENTAL LEGISLATION IN WEST VIRGINIA.

We gave in the April number of the Dental Cosmos the text of a bill to regulate the practice of dentistry in West Virginia, which we were informed had become a law in that State. It seems that the information was premature, as the bill has not yet passed the senate. It is confidently expected, however, that it will be made a law at the next session of the legislature.

BIBLIOGRAPHICAL.

Johnson's New Universal Cyclopædia. Vol. II. New York: A. J. Johnson & Son.

The second volume of this most useful work more than justifies the commendation pronounced upon the first. In comprehensiveness, in thoroughness, and in accuracy, it is truly a wonderful compendium of knowledge, a storehouse of facts, a library in itself, more nearly exhaustive of all human knowledge than one could have conceived within the limits of possibility.

The plan of the publication committed all subjects of special interest to men who were recognized as authorities in their various lines of thought and investigation. These have written over their own signatures, thus giving assurance of more thorough and exact treatment of the various topics than could have been otherwise obtained. Thus, in geography, biography, law, pathology, medicine, physics, chemistry, natural history, and the sciences generally, the work is pre-eminently practical and reliable. The number of specially qualified writers who have been engaged upon the work is without precedent in any previous publication. The more the plan of the work is examined, and the more the peculiar fitness of the men who were selected to supervise its preparation is considered, the stronger will be the conviction that it is the most valuable compend which has ever been published.

A Plea for Art in the House. By W. J. Loftie, B.A., F.S.A., author of "In and Out of London." With illustrations. $1.00.

Suggestions for House Decoration. By Rhoda and Agnes Garrett. With illustrations. $1.00. Philadelphia: Porter & Coates.

These are the first of a number of forthcoming volumes, entitled the "Art at Home Series," reprinted from a London edition. The books are thoroughly English in style and tone, and fortunately no attempt seems to have been made to "adapt" them to this country, as is too often done with English works on practical subjects.

The first of the volumes before us will be of more interest to those who have the time and means to collect works of art and bric-a-brac, and by such the suggestions will, no doubt, be found shrewd and practical. We object, however, to the terrible example of one "Smith," whom the author represents as having been so imbued with the love of artistic household wood, that, although a well-to-do man, he consumed ten years in hunting old tables and chairs wherewith to furnish his house, and pursued a certain side-board for many years before he finally secured it. It would be interesting to know the mental history of Mrs. Smith during those years.

In the other volume the authors give a very sarcastic picture of the average London house, but to our mind the description does not always bear out the sarcasm. The hints and suggestions in this volume are numerous, interesting, and in the main valuable and practical to everybody.

What the world calls good or bad "taste" is often a mere abstraction or a matter of custom; but among the familiar surroundings of home it becomes a tangible thing, a personal experience, and *there* its greatest influence must ever be found.

J. A. B. W.

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

Will some one be so kind as to give a young practitioner information concerning a very serious case of necrosis and exfoliation of the inferior alveolar process? The case has been going on for three months, and has baffled the skill of a good surgeon. Any information as to the treatment of this case will be thankfully received.—O. T. M.

Will some well-informed practitioner tell me how an electric battery is put up for the purpose of relieving pain in extracting teeth, and if such batteries are sold ready for use? and oblige C. M.

What is the best thing to be done where the canines are crowded out of the arch?—G. A. R.

I would like instruction in regard to the best treatment for bad breath.—G. L.

Why is not alum a useful ingredient in tooth powders?—Alum.

Why is not charcoal a good dentifrice?—Charcoal.

Reply to Jersey, who asks concerning the relations between teeth and ears.

In referring to the anatomy of the parts spoken of, Jersey will be at little loss in coming to a conclusion as to the possibilities of his case. Ringing in the ear (tinnitus) is commonly enough caused by a diseased condition of the dental organs, and where no immediate cause is found to explain the condition, the teeth are to come in for a full share of attention. The more common causes of tinnitus are inflammation of the Eustachian tube, lodgment of foreign bodies in this duct, thickening of the membrana tympani or ulceration of that membrane, excess of wax in the ear, lodgment of insects, etc. As constitutional conditions, predisposing to or exciting the condition, may be enumerated anæmia, continual constipation, and various diseases of the brain. Many cases of tinnitus that have long baffled the ordinary attempts at cure have disappeared almost immediately on the extraction of a diseased tooth never thought of in this connection. We can only advise D. D. S. to inform himself fully as to the nature of tinnitus, and, in the absence of any of the more common causes, to put the teeth of his patient in such order as will afford assurance that they are in no way sources of irritation to the nervous system. In cases defying the powers of diagnosis—and there are many—it is recommended by Dr. J. A. White, of Baltimore, that tenotomy of the tensor muscles be performed. Weber, of Berlin, pronounces the operation as most satisfactory in its results.—A.

Answer to V. E. N., who asks concerning the transmission of the syphilitic virus.

It used to be said by a now retired professor of surgery that he had never met with a clergyman having the disease but that it had been taken through infection by a privy-seat; but that he had never seen it in the case of a medical student where it was gotten in other than the natural manner. Our own experience does not, however, agree with that of the surgeon. We have seen and treated chancres of the lip, where the disease could only have come through a kiss, and we have known physicians to be inoculated in the act of the obstetric touch. It is, to say the best of it, a slovenly thing to pass instruments unwashed from one mouth to another; it is a risk too great to be taken. At the time of writing this paragraph we have under treatment two cases of syphilitic disease of the mouth, in which we believe the patients never to have been subjected to the ordinary causes productive of the condition; neither do we find ourselves at all able to explain its presence. Earlier in our professional experience we had under treatment a young lady of whose virtue we were so entirely satisfied that it never entered our mind that a sore on her lip, which resisted all the usual means of treatment, might be a chancre. An eruption on the skin settled the matter, and, adopting an antisyphilitic course, chancre and eruption quickly disappeared. Venereal ulcers of the mouth are very common, particularly with the persons of smokers. Many of these sores are very infectious, and there is no reason why a steel instrument should not be the means of a conveyance of the poison.—J.

Reply to C. O. B., who asks concerning a case of neuralgia. A neuralgia of the location described commonly finds explanation in one of two causes. Either it arises from a diseased tooth or from an ovary in a state of subacute inflammation. To discover any lesion existing in the first direction would not seem to be a matter offering any difficulty. Observation will quickly exhibit a relationship between cause and effect. No cause of temporal neuralgia is, however, so common as that of ovaritis. A feature markedly distinguishing such cause is the relation of the pains in neck and face. In the neuralgia arising out of ovaritis the pain begins in the neck and shifts to the face; in the reflected odontalgia this is reversed. We judge it to be unnecessary to suggest the manner of treatment should our correspondent discover his case to be one of odonto-neuralgia: his D.D.S. fully covers that ground. In ovaritis it is necessary to enter upon more enlarged inquiries. The most common cause of irritability of the ovaries arises out of too free sexual congress, particularly if with this be conjoined an anæmic state of the system. Females afflicted with ovaritis are commonly of the delicate or languid classes. The diagnosis is derivable through palpation over the suspected parts. The treatment consists in abstinence from all causes of excitability, in the local use of anodyne applications, belladonna being among the best of such applications, and in the free and long-continued use of iron, quinine, and arsenic. Hip-baths of cold salt water are highly commended.—W.

Reply to Toulon.—The tumor so plainly described in your query is undeniably aneurismal, and you are to esteem yourself quite fortunate in getting the hemorrhage under control at so little expense in the way of trouble; the carotid artery has had to be ligated from less cause. A patient situated as is yours is in immediate danger of death; the case admits of no delay. Unless Toulon has continued his studies into oral surgery, we would advise that he shift the responsibilities of the case as soon as possible; if, on the contrary, he is prepared to treat such conditions, we would advance it as our experience that the very best thing to be done is to cut down upon and put a ligature about the primitive carotid. If the tumor, as is to be inferred from its size, confuses the superior triangle of the neck, the vessel is best exposed below the omo-hyoid muscle. A more risky plan of treatment is to make a quick opening into the cyst and hastily pack it with a muslin strip strongly saturated by some styptic. The first-mentioned operation, however, is the one to be preferred: little immediate danger exists in it. A treatment well worthy of trial is to be found in a digital compression of the carotid kept up for twenty or thirty hours, or until all thrill disappears from the tumor.—T.

Answer to a Young Practitioner concerning treatment of periodontitis.—Your correspondent is to recognize that the condition concerning which he inquires is one of inflammation. By inflammation is meant disturbance of circulation; by local inflammation is meant that a part is put into a diseased condition by reason of too much blood circulating in or about it. To cure an inflammation we have simply to get the excess of blood away from the affected part.

Inflammation never exists as a thing in itself; it is a condition that arises out of the presence of some agent or cause of irritation. Irritation means the presence of an irritant. In treating an inflammation, whether of a tooth or a toe, whether of a periosteum or a brain, the first thing to do is to look for the irritant, and, this being found, to remove it, if that be possible. Irritants are of the greatest possible variety and signification, being in one case plainly evident and cognizable to touch or sight, as, for example, a crumb of bread lying upon an exposed tooth-pulp, or a particle of dust resting upon the mucous membrane of an eye; in other instances being so obscure that no diagnostic skill has as yet been developed sufficient to enable a practitioner to comprehend them. Besides irritants of a strictly local expression, there are others which are of a constitutional nature, as, for example, where a periodontitis is seen to arise out of the venereal disease, or out of rheumatism, or out of miasmatic poisoning. Again, irritants are found to exist which are of double significance, as gall-stones or the nephritic calculi or tubercle.

A cause removed, it is fair to infer that an effect dependent on that cause will disappear. "Young Practitioner," then, is to look first for a cause upon which the periodontitis may depend. Most commonly this cause is found to lie in a dead pulp; it may lie, however, in some constitutional vice. A cause of disease recognized, a first and the most important step in treatment is to remove or antagonize. A dead pulp is to be extirpated; a blood vice is to be corrected.

Effects, however, do not always disappear with a cause. A fired house does not necessarily cease to burn when the torch which lighted the blaze has been put out. Effect is to be combated. Whatever the means employed in battling with an inflammation, the principle of treatment is to be understood as being a common one. To get the blood away from the part is to do all that can be done.

In incipient periodontitis excellent results are not infrequently obtained through so simple an operation as scarifying the gums; this repeated three or four times is a means upon which much reliance is to be placed. Another means is the hot foot-bath; others, the free use of saline purgatives, or of a diaphoretic or a diuretic. Counter-irritants play an excellent part; a blister upon the back of the neck or upon an arm or leg. Sedatives directed to the arterial or to the nervous system, or to both, afford satisfactory results. The following is a formula which will be found very reliable:

℞.—Potassæ bromidii, ʒij;
Tinct. verat. virid., gtt. xl;
Aquæ, ℥iv. M.

Dose, tablespoonful each four hours.

Chronic periodontitis requires a treatment which, in many cases, is the reverse of that demanded by the acute expression of the disease. Of course nothing is more important than that the pulp-cavity be properly cleansed and filled. It is necessary to a cure that all particles of tartar be removed from about the neck of the affected tooth. The passive congestion that is found to exist is to be removed by free lancing of the gum and the application of stimulating remedies; the compound tincture of capsicum, properly diluted with water, is to be recommended as among the most reliable of the stimulants; tincture of iodine, diluted with alcohol to one-half the officinal strength, is another most excellent application. When a sac exists at the end of a fang, as in the condition of abscess, it is well to tear such sac to pieces by means of a barbed probe introduced through the fistule; following this, stimulants are to be pumped into the cyst.

In the many cases of abscess arising out of anæmia where constitutional medication is required, dependence is best placed in the use of iron. A favorite preparation is the muriated tincture, of which the dose generally prescribed is fifteen drops, given in half a wine-glass of water three times a day. The principle of treatment is to stimulate and to evoke the reparative strength.—F.

ANSWER TO STYPTIC.—Hot water as a means of controlling hemorrhage is at the present time attracting attention on the part of the medical profession. For over-free bleeding about the oral cavity it is simply to be held in the mouth hot as it can be endured. For wounds of external parts it is best applied by pouring from a vessel; or where the aid of a compress is necessary, this is, after first soaking, to be bound over the wound and kept hot by a constant pouring of the hot water upon it.

Alum added to hot water has been employed by an oral surgeon of our own city for many years; the salt is an invaluable addition. The saturation is to be full,—that is, as much alum is to be added to the water as it will dissolve.

No hæmostatic equals, however, a ligature. When such a means can be employed it is always best to resort to it at once. A bleeding vessel is in its best condition when a string is fixed tightly around it.

The carbolized catgut, which is now so much used, does not interfere at all with a union of parts by first intention. A vessel strangulated by this agent can be inclosed as though it were without ligature.—H. W.

A SINGULAR CASE IN ORAL SURGERY, March 23d, 1876.—Miss F. B., aged twenty-four, having a crowded inferior dental arch, applied to Dr. H. Todd, of Columbus, Ohio, for the purpose of having the wisdom-tooth of the left side extracted. The tooth had a very small cavity on the grinding surface. The lady states that the forceps being applied, the tooth was felt to move in its alveolus, yet remained attached to the gum. Lancing the gum thoroughly, Dr. T. attempted the removal of the tooth with an elevator. The first application of force was followed by a mysterious disappearance of the tooth. Stating to the patient that the crown had snapped off and been lost in the blood which followed, the attempt to find the missing root was continued for half an hour, at the end of which time the patient was so exhausted that she had to be sent home in a carriage.

Intense swelling and inflammation supervened, together with severe trismus and difficulty of deglutition. The patient was for nearly three months confined to her bed, being sustained by Liebig's extract of beef and other liquid food. In May an external sinus formed beneath the angle of the jaw, which afforded much relief through the immense quantities of pus discharged. Before and after the formation of the sinus, several spicula of bone exfoliated near the base of the tongue. In September the recovery had so far advanced that the lady again resumed her occupation as teacher in the city schools.

At the Christmas vacation she visited Lancaster, Ohio, and while there discovered, as she supposed, another piece of bone exfoliating near the base of the tongue, behind the palato-glossus muscle. She immediately applied to Dr. J. C. Scott, dentist, who, after one and a half hours' work, succeeded in dislodging the *entire missing tooth*, with the transverse process still inclosed between the roots.

The tooth had been nearly ten months working its way from its point of entrance to the spot from which it was extracted. The external sinus quickly healed, leaving very little eschar; deglutition became natural and easy, and the cure is pronounced complete.

A suit has been brought against Dr. Todd for damages in the above case in the sum of two thousand dollars, the advisers of the lady attributing the accident to inexcusable carelessness on the part of the operator.

In consequence of the legal aspects of the case, we forbear all comment until a judicial investigation shall determine whether the above conclusions are well founded. A similar case is reported in the *Detroit Review of Medicine* for December, 1876, which, I think, is the only other case of the kind on record.—J. H. WARNER, D.D.S., *Columbus, Ohio.*

THE

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 231.)

1. *A proper preparation for the application.*—This should consist of the thorough washing from the cavity of all its non-adherent contents; gently and carefully loosening them with a small-sized probe, or selected excavator, in order to facilitate this process.

It should always be remembered that *tepid* water is constantly indicated, and that each time before syringing the proper temperature of the water should be assured by touching it with the finger.

The *direction* of the stream, which should be against a wall of the cavity, and not pointed toward the pulp-cavity, and the *force* of the jet, which should be as moderate as is consistent with the attainment of the desired result, should also never be forgotten, but be made *a matter of habit.*

The cavity should then be dried, and such amount of excavating be done as may be without the infliction of any pain, removing particularly the bulk of decay from the outermost portions, and gently enlarging, *if easily possible*, the orifice of pulp-exposure.

It is not advisable to trim the external edges or irregular projections of enamel, as would be done in a preparation for filling, as these will usually subserve a valuable purpose for the better retention of the covering cottons, but only so much of this should be indulged in as is necessary for the easy and accurate introduction of the arsenical application.

Having again carefully washed out the cavity and cleansed the surroundings, all should be dried, and *all pain subdued if any exist.*

Just in proportion as pain (indicating pulp-irritation) is present at the time of an application of arsenious acid, so is the action of the medicament interfered with.

It is *theorized* that this is so, from the fact of existing serious interference with normal functional action; which deviation interposes a relatively serious obstruction to that introduction of the arsenic which is concomitant with comparatively normal absorption.

An application of oil of cloves, or, if this prove insufficient, the paste of acetate of morphia and oil of cloves (1 drop to 1 grain), made gently, by means of a pellet of cotton, will usually suffice to accomplish this object in from one to fifteen minutes. If this prove inadequate, an alternate application of phénol-sodique with the oil of cloves or the paste, or in some instances a persistent use of the phénol-sodique alone, will meet the required indications in these exceptional cases.

Again, if this prove unavailing, in such rare instances the local obtunding power of chloroform is quite certain to afford the desired relief. It is extremely unusual that this application is demanded, and it is only when imperatively called for that chloroform should be employed. It is certainly a dangerous remedy, and experience has proven that *but few inhalations* are *essential* to a fatal result.

It is also the universal experience that *little or no warning* is given when this deplorable sequence has been pronounced; and certain it is that both diagnostic skill to detect the warning, if any be given, together with adequate knowledge for the employment of restorative measures in case of need, is *lamentably deficient* not only among the members of our own profession, but *equally so* with the general practitioners, for whom it is customary to fly in such haste when these sad occasions seem to demand *additional aid.* They only come, they see, *and are conquered.*

Having, as the result of a few minutes' application, relieved all existing pain, we have to consider,

2. *The proper placing of the medicament.*—This should be done with the utmost possible accuracy, taking a portion of well-stirred paste, about the size of a small bead or large pin's head, either upon the point of a probe, or upon a *tiny* pellet of cotton dipped in oily carbolic acid; it should be placed directly on and around the point of exposure, taking especial care that no arsenic should encroach upon the outer portions of the parietes of the cavity, *much less escape outside the cavity.*

3. *The proper guarding against danger from the arsenic.*—When it is distinctly understood that no danger is at all likely to ensue from the so-called "passage of the arsenic through the pulp and its escape through the apical foramen," and that this can only occur in par-

tially absorbed deciduous teeth and not fully formed permanent teeth, in which the open ends of the roots cannot be fairly regarded as foraminated, and when it is as distinctly understood that grave trouble may, and indeed is almost certain to ensue if the smallest appreciable quantity of arsenic escapes outside from the cavity and enters into surrounding tissue, then, a correct knowledge of the requirements will do much toward insuring the right effort in the direction of a *proper guarding against danger from the arsenic.*

In circumscribed cavities upon the articulating faces of bicuspids and molars ordinary care will suffice for all practical purposes.

The precaution of a relatively small amount of arsenical paste, in proportion to the size of the cavity, and due attention to the fourth consideration (proper maintenance of application), is all that is needed.

But in cavities between teeth, and *particularly* just in proportion as these cavities approach and impinge upon the cervical portions of the teeth ; and *more particularly still*, as the cervical wall of the cavity of decay is broad and shallow, as is frequently the case between bicuspids and molars, *then danger is excessive.*

In such cases, after a careful preliminary preparation of the cavity, a small, elongated pellet of cotton, saturated with creasote or oily carbolic acid (I always use the latter), should be gently and neatly forced between the teeth, above the cervical edge of the cavity, against the gum.

This guard mechanically presses the soft tissues away from the cavity, while the oily carbolic acid or creasote, by its escharotic power, kills the mucous membrane covering the gum at this point, and thus interposes dead tissue as a preventive of arsenical absorption, should any of this potent devitalizer unfortunately escape in that direction.

Again, as arsenic, so far from being soluble in these medicaments, is *insoluble*, so much increased security is afforded as is gained by this additional barrier.

After this precaution has been taken, the cavity and surroundings should be dried, and the arsenical application, in small bulk, carefully and accurately placed *within* the cavity.

I deem it of importance that I should mention, in this connection, the great care which must be exercised in cases where contiguous teeth have, upon their approximating faces, the slightest (even incipient) decay.

Time has proven that very superficial employment of arsenious acid for the removal of sensitiveness from dentos is liable to be followed by the eventual devitalization of the pulp ; therefore, in every instance where the abrasion of enamel is sufficient to indicate incipient decay, I make only soothing applications in the cavity containing the exposed pulp, until I can protect the cavity of simple caries by permanently filling it.

4. *The proper maintenance of the application in position.*—This last consideration has its great share of importance, for upon it depends much of the effect of the medicines in the direction in which we desire that they shall work.

It is not that a comparatively short application of arsenic to pulp-structure would be insufficient to so impress that organ as to cause its death, nor that a very long continuance of medication is essentially desirable; but it is, from every view, better that each step of this procedure should be maintained as made until modified by the operator, while it is also true that some changes may so act as to work much harm in spite of all reasonable precaution.

These are mainly changes of position of coverings to the application.

Usually a covering of one or more small pellets of cotton dipped in carbolic acid, together (when the size of the cavity will permit) with an extra cotton dipped in solution of gum benzoin and sandarac (equal parts), is amply sufficient for all practical purposes.

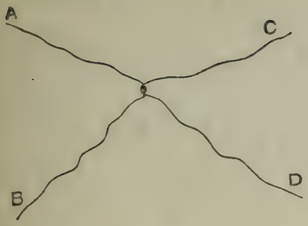
These should be placed in position with a constant remembrance of the danger of pressing some of the arsenic out of the cavity, and should be so manipulated as best to avoid doing this.

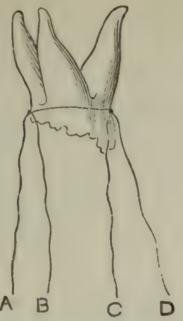
It is for this reason that I use and advise pellets of cotton, dipped in carbolic acid, rather than wax or gutta-percha, my experience having been that the cotton makes a covering easier of adaptation and less liable to leakage.

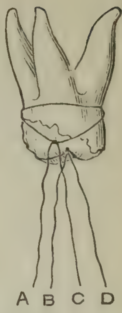
It is sometimes found that open-mouthed cavities of extensive decay are insufficient to retain any covering to arsenic applications, and also that cavities upon the labial, palatine, and buccal faces of teeth will occur, of such shape and shallowness as would give rise to the same difficulty.

In these cases the use of ligatures of silk, gilling-twine, or bookbinder's thread (I prefer the latter for all dental ligation) will be found to overcome all trouble.

For labial, palatine, and buccal cavities, a single or double ligature passed around the tooth is all that is requisite; but for large, shallow cavities upon the articulating faces, in many instances having nearly all the crown gone, a four-tailed ligature should be made by tying two pieces of thread thus: A B one piece, C D the other; then by passing the ends A B round the neck of the remains of the tooth, and tying them, they fall on one side, while the ends C D fall on the other; then make the arsenical application, cover it with a good-sized pellet of cotton, and secure covering by tying A C and B D; and again, if deemed necessary, by the further tying of A B.







NOTE.—I have, among my patients, more than a hundred of such teeth as are diagramed, which, with *amalgam* crowns, have served as supports for pieces of *gold clasp* artificial work for periods of time varying from three to fifteen years; and almost invariably, when the crowns of teeth used for clasping decay and break off, I treat the roots, and by building up amalgam crowns render them even *more serviceable* and more comfortable, from the facility of *accurate adjustment*, than ever before. Since the introduction of "Standard Alloy" this operation is more easily accomplished than was possible formerly, as the entire crown is built at one sitting, and hardens sufficiently in less than an hour, to permit of clasping without danger of breaking.

Action of arsenious acid.—I have already written so much, and so often, upon this subject, that it would seem unnecessary that I should do more; but the knowledge that many thousand new members have been added to our ranks since I last wrote, together with the deplorable fact that the very latest text-books still persist in statements that the most simple experiments demonstrate to be utterly false, compels a belief, upon my part, that blow after blow will have to be dealt before these time-honored dogmas will be universally conceded to have no foundation of truth.

This I consider to be the more important to the large majority of young practitioners; for, by disabusing their minds of such teachings as are usually given in this connection, an immense amount of suffering will be saved to those whom they may be called upon to serve; and great commendation will be awarded them by patients, as comparisons are drawn between the comfort they bestow and the tortures which had been previously endured as the price for the salvation of their teeth.

I have been surprised to find that teachers still continue to promulgate the doctrine of the necessity of prompt removal (twelve, twenty-four, or forty-eight hours) of arsenical applications for *fear of peridental irritation through the apical foramen*, when by leaving the application in a hundred teeth for a month each they would learn that not one in the hundred would give any support to the foolish idea.

I have had, during the past twenty years, arsenical applications of from four days' to two weeks' duration in *more* than *a thousand* teeth, and in *every instance* these teeth have given entire satisfaction,—the most of them (nearly all) being still in service.

In at least a hundred cases circumstances have combined to detain the applications for from *two* to *six months*. and *never in a single instance* has subsequent trouble occurred which was in the least degree traceable to arsenical complication, or which differed, in any degree, from ordinary peridental irritation, attributable to ordinary causes, and treated, with the usual large degree of success, by ordinary methods.

I put this thus strongly because I feel it to be my duty at this time to make that final impression which shall cause many to *think*, and some, at least, to modify their practice by instituting that experimenting which I assure them they may indulge in to their great satisfaction and to the great comfort of their patients.

There is no danger from arsenic *inside* a fully formed tooth; but there is great danger of serious trouble if *even a little* is permitted to get *outside* and come in contact with *soft tissue.*

A normally-formed apical foramen is *never* the route by which arsenic irritates surrounding structures, but the cheek may be seriously and painfully irritated from applications in buccal cavities; a tongue or a lip may be largely abraded by application in lingual or labial cavities; and gum, jaw-bone, and *even adjoining teeth*, may be sacrificed, as the result of leakage, or actual forcing out of small portions of arsenical paste from *cavities between teeth.*

I must repeat that these cavities *between teeth*, and those which, in any position, *impinge upon gum-tissue*, are the places which imperatively demand all possible care. It is almost enough to know this partial truth, for with this knowledge only all danger *may be* avoided.

I shall refer to these dangerous cavities again, when upon length of duration of application.

In a series of experiments with arsenious acid applications of one-twenty-fifth of a grain, by accurate weight (this being taken as the usually recommended dose for pulp-devitalization), bound to the feet of frogs weighing variously from two to *nine ounces*, I demonstrated that the poison was capable of not only killing, but so permeating at least one hundred thousand times its own weight of tissue as to *prevent entirely the slightest putrefaction.*

The frog which weighed *nine ounces died* in four days (about one hundred hours).

After the same sized application has been forty-eight hours (half the time) in contact with so trifling an amount of tissue as a dental pulp, directions are given by the text-books to examine, and then "if, on the removal of the arsenic, *the pulp be still sensitive*, a renewal of the application is the practice most advocated."

Surely, if it journeys foramenward, it *ought* by that time to have passed enough not only to thoroughly devitalize and *for all life preserve the little pulp*, but to have sent enough on its errand of devastation to quickly destroy an entire maxilla.

(To be continued.)

THE HOMOLOGY OF THE DENTAL TISSUES, THEIR SUSCEPTIBILITY TO SUPPRESSIVE ECONOMY, AND THEIR PRESENT DEGENERACY IN MAN.

BY A. H. THOMPSON, D.D.S., TOPEKA, KANSAS.

PART III.—PRESENT DEGENERACY IN MAN.

THE fact of the degeneracy of the tissues of the teeth of contemporaneous man of the current age from a perfect type requires neither demonstration nor reiteration. To every dental surgeon it is a matter of every-day observation in the treatment of dental lesions, and to nearly every member of the human species it is a matter of subjective experience,—too often, indeed, made apparent by the acute suffering of which it is the cause, and the inconvenience it occasions by the loss of the teeth.

The query of *why* this should be so is probably as old as history. Defectiveness of the teeth, indeed, antedates written records, although such phenomena of disease as they present in human remains found in pre-historic sepulchres are more infrequent than occur in savage tribes to-day, and are but a fraction of that manifested in civilized nations of our time. There has been progressive increase in diseases of the teeth in man since primitive ages, with more or less fluctuation in the rate of progress, until at the present time the aspect that meets the eyes of the dental profession is appalling and distressing, so extensively disastrous have dental diseases become.

This condition must be largely due to mere deterioration of dental structure, to a defectiveness of tissual organization, and although abnormal oral fluids are an important factor of dental disease (and their deleterious influence is great), it is an important fact that good tooth-structure is almost impregnable. Of course dental defectiveness and aggressiveness of the abnormal oral fluids are usually found together, and also good tooth-structure and normal fluids. Yet it is widely observed that teeth of good innate organization rarely succumb to any condition of abnormal saliva that may supervene after their eruption. Most of the apparent exceptions that occur to this rule will be found to be with teeth of defective organization, and the cause of their destruction to have been the same as that of the most apparent case, —a difference in degree, but not in kind, of disease. It is fairly demonstrable that the destructive diseases of the teeth of man to-day, and especially caries, are mainly due to defective tissual organization.

In the investigation of the *cause* of this deterioration of dental structure we enter a field filled with controversy, and where truth is yet a stranger. If the cause were once known, it is safe to say that a remedy might be found which, if extensively applied, would bring alleviation of the suffering and inconvenience that have ensued, and confer appreciable benefit upon the race, though it could scarcely cure the evil entirely. But far from this as yet having been the case, or the current being even guided in its course, the destruction progresses with increasing ratio and rapidity. It is within the memory even of a generation yet living, when the general condition of the teeth was much better than is to be found to-day, except in a few individuals, and a century ago scarcely a third of the disease now prevalent existed. The cause of this precipitous deterioration and destruction has baffled all investigators and theorists. It has fallen like a catastrophe, and, like a besom of destruction that regards no barrier placed in its path, threatens to sweep the teeth from man within a few centuries, if it should maintain the ratio of increasing speed exhibited during the last hundred years. Whence it has come, why it should be, and whither it tends, are problems which we can only contemplate with a feeling akin to despair, for no human power seems capable of answering.

Contemporary professional thought is almost unanimous in attributing this deplorable condition of affairs to the deficiency of calcium and magnesium salts, particularly the former, in the organic structure of the tooth. These minerals going to harden the dental substance, their deficiency and absence permits solution of the enamel and dentine by acidulated oral fluids, and the disintegration of the entire tooth-body in the disease called caries. The deficiency of these salts is due, it is claimed, to an insufficient supply of foods containing them during intra-uterine existence, infancy, and childhood. The one food which is said to contain the most of these vital mineral constituents is that derived from employing the whole grain of wheat, oats, etc., the outer part of the grain, which is bolted away from the inner part in making fine flour, containing the largest amount of calcium and magnesium salts. This separation of the parts of the grain deprives the human system of the mineral salts, and the teeth are in consequence deficient in inorganic material, and fall a ready victim to caries. It is scarcely too much to say that this theory is to-day the prevalent opinion in the dental profession as to the cause of the present degeneracy of the dental tissues in man; but while there is an appreciable amount of truth in the hypothesis, it has, most probably, been carried to an extravagant extreme in the ultra claims that have been made for it.

We feel safe in asserting that, if the people of the United States were compelled to use unbolted flour bread, oatmeal, etc., for ten generations, which would give ample opportunity for the display of the merits of the treatment, the destructive career of caries of the teeth would *not* be stayed. That there would be some effect for the better we willingly concede, for any strict and wholesome regimen would be beneficial, and this one would possess, though in a much smaller degree than is claimed for it, its special merits. The claim that the whole fault of the present degeneracy of the teeth is due to this cause can scarcely be entertained as conclusive. The experiments that have been conducted in the interests of the theory are inconclusive from being too limited and incomplete. Slight benefits have, of course, followed the employment of the regimen recommended as the one and only remedy, because there is a modicum of merit in it for the purpose, and the food is wholesome and useful. Yet to expect a complete revolution of existing conditions by the method is out of the question.

Special dieting can, of course, bring about particular results in many species of animals, as has been demonstrated, but physiological science has not reached the point where certain results can be promised with mathematical accuracy from the employment of any given kind of food. In this we think the supporters of the unbolted flour theory are at fault; they claim what science has not attained.

The food itself is unfitted for the extensive and usurping employment they would obtain for it, and cannot, for several chemical and physiological reasons, furnish the inconceivably great amount of special nutriment that the teeth require for their resurrection and immortality. On this subject we would notice some observations of Prof. Edward Smith ("Foods") bearing upon this point. "When the bran of wheat is eaten by an animal, whether man or horse, it will be found in the excrement having this layer still perfect, but the more nutritious part, which is covered by the silica, will have been digested in proportion as it was reduced to a fine powder, and allowed to remain sufficiently long in the stomach and bowels. . . . It is of common observation that in proportion as the piece of rind is large and indigestible, so is it a stimulant or irritant of the bowel. So far, therefore, however rich the rind may be in nutritive elements, it is more likely to prevent than to sustain nutrition, since it will lead to the quicker removal from the body not only of itself, but of other and perhaps more nutritious matter. When, however, it is ground into fine powder it does not produce this effect, and although the silicious part may still be undigested, the lignine and starch which it covers may be partially digested and promote nutrition." The grain is composed of different layers, which "increase in nutritive value as we proceed from without inwards. The outside layer, or coarse bran, of the least nutritious, and as the exterior is covered with a layer of silica, it is so far indigestible, and remains as a foreign body in the bowel, setting up irritation, etc. . . . Its nutritive value in this form is limited to the starch and gluten which lie on its inner side. . . . That it can add directly to nutrition is impossible; and whilst it may be very useful to those who are well fed and need a laxative, it may be worse than useless to the ill fed who need nourishment. . . . Good seconds flour is the cheapest and most nutritious, if not the most digestible of the series, and when thirds are produced, or even when the bran is ground to a fine powder and added to the flour, the actual amount of nutritive matter is probably less than with seconds," etc.

We thus see the doubt that is thrown upon this method of dieting for the benefit of the teeth, and yet this is the most promising course of remedy that could be attempted for either prophylactic or reconstructive purposes. The broad truth is that the wave of destruction has gone too far, and that the work of hundreds of generations who have transmitted teeth that became gradually worse and worse cannot be undone by a millennium of dieting. The fault lies deeper than merely being the effect of unfavorable diet, and is the result of those silent but tremendous forces in nature that make, modify, and destroy species. Some of the multitude of natural laws influencing all animal life in all times and grades of its existence are at work upon the teeth of man, influencing them in a forcible manner for the worse.

Comparative anatomy teaches us that the teeth of man have passed the age and era of their perfection as useful organs, and that they are now, in fact and reality, more or less rudimentary. In their present condition in the species, when many individuals possess dentures of comparative perfection, this fact is not readily apparent, but a close comparison of a number of dentures with that of any other animal whose denture is complete will demonstrate the fact.

The disuse of mastication has been the principal force in reducing the teeth of man and causing them to become rudimentary. Mr. Darwin ("Descent of Man") explains the operation of the law as follows: "Disuse at that period of life when an organ is chiefly used, and this is generally during maturity, together with inheritance at a corresponding period of life, seem to have been the chief agents in causing organs to become rudimentary. The term 'disuse' does not relate merely to the lessened action of muscles, but includes a diminished flow of blood to a part or organ from being subjected to fewer alternations of pressure from becoming in any way less habitually active." Every condition of this law is fulfilled in the case of the teeth in man with a precision that is almost an emphasis, and in the passage quoted we find the secret of the rudimentary condition of the teeth in form and structure, and the cause of their deterioration, which promises ultimately to induce their abortion. The effect of disuse, as determining and inducing the suppression of the teeth, is paramount to every other force. When a part or organ begins to pass into disuse, as took place in the case of the teeth in man in the troglodytic age, its reduction becomes assured. The diminishing importance of the function of mastication, by reason of the artificial reduction of food then commenced, has continued to increase in direct ratio to the developing of the methods of preparing food. The teeth were less and less actively employed, they began to be superfluous and injurious in a slight and gradually increasing degree, the cost of their maintenance was too great a demand on the system, and not being upheld by direct and active employment, they started on the way to final suppression, which we witness in progress to-day.

The principal force in determining this suppression is *economy of growth* and maintenance. The stimulus of continuous use being slowly withdrawn, the nutrition of the part would gradually diminish, and imperfect development would first supervene as the vanguard of systematic suppression. The part would cease to be normal in structure and form, and this abnormality would increase with continual disuse. Economy of growth would act with increasing force in depriving the part of constructive and sustaining nutriment, and in time the part would be correspondingly defective in structure and form. The force acts in a variety of ways with different tissues, of course, but in the case of the teeth we may now observe what appears to be the attainment of an unusual condition of extreme deterioration. These organs seem to present a remarkable manifestation of this condition of tissues, in being in man at the present time extremely defective in form and structure, so much so as already to appear as rudiments. To this cause must be assigned the result of their especial susceptibility to disease. That this is the effect of defective nutrition and the deprivation of formative material there is no doubt; but that it is not the result of any recent want of such material, and that the fault cannot be corrected by special dieting for a few generations, we feel equally certain. The fault lies in the civilization of the race, and dates from the time the first fire was kindled to cook food, and is as inseparable from civilization as any of its benefits or evils. We must accept the fact of the defectiveness of the teeth, treating and preventing disease by all the means possible, but not indulge in any vain hopes of turning the destroying tide, for the result is inevitable.

But even in view of the preceding facts it is difficult to perceive how the present precipitous destruction of the teeth by caries can have arisen. Their recent especial susceptibility to the dissolving powers of the oral fluids cannot have been the work of a few generations of mal-nutrition, as the superficial appearances suggest and as many theorists uphold. It seems far more probable that it is the effect of a comparatively sudden deterioration of the oral fluids, which have taken on abnormal action that was easily transmitted and increased. The structure of the teeth has, of course, deteriorated, but it has not been due to the direct and instantaneous effects of mal-nutrition. The cause of the precipitous destruction of these organs during recent generations still remains a mystery, but we think the solution will be found in the principle suggested, and the cause in the forces we have mentioned.

Secondary forces are at work assisting in the massacre of the teeth which must also be recognized, and some of which we will briefly notice. What may be called *erratic nutrition* is one of these,—*i.e.*, the irregular nutrition consequent upon under-feeding, high-feeding, and erratic diet. High cooking of all sorts may be included under this head, where highly flavored and prepared dishes to pamper the palate are employed, and which supply both excess and deficiency of nutriment to the system in irregular variability. This kind of food induces indigestion, mal-assimilation, mal-nutrition of the tissues, retardation of growth, and abnormality of gastric and oral fluids, with their attendant train of evils.

Correlated variation is a force that has operated upon the teeth and contributed to their reduction,—*i.e.*, the variation of correlated parts as influencing the teeth. In civilized man the extra-vascular parts are subjected to extensive suppression and variability; and abnormality in their condition is manifested also in the teeth. What effect the hairless condition of man may have upon the teeth we cannot trace out, but it has doubtless amounted to an appreciable influence. The correlation between the teeth and the hair and nails of man is most probably more far-reaching and influential than our knowledge or theories suggest at present. We notice that in all animals not possessed of hair, as the classes of fish and reptiles, the enamel is either partially or totally absent; the same may be said of the hairless mammals, as whales, armadillos, etc., though of course it is deficient in some that are possessed of hair. What definite relationship the present defective enamel of the teeth of man may have to his present quasi-hairless condition is difficult to perceive, but there may be an increasing incapacity for the production of corneous tissues in the species, aided by artificial protection of the skin.

Miscegenation is a force that, in these days of rapid transit and of migration of peoples, exercises an influence in depressing the integrity of tooth-structure along with other parts of the system. The intercrossing of breeds and races is rarely productive of benefit, when as widely separated as are those of the human species. Human hybrids are notably deficient in physical completeness and vital power; nutrition is impaired and physiological processes weakened, so that the entire economy is depressed and abnormal. Especially is this true of the American people, who have a continuous stream of foreign and heterogeneous blood pouring into their veins. The depression that has ensued to the physique of the people of the United States may have contributed to the existing extra-defectiveness of the teeth of Americans over those of older nations. The physical type is lowered by the effect of the mixture of races, and will remain so, so long as immigration continues, with a corresponding effect upon the teeth of greater or less manifestation.

Climatic and *physical* influences of the soil and air may exercise some effect, especially in America, where but a small part of the people can be considered as approaching acclimatization, in having resided in one locality more than two or three generations. The American people are semi-nomadic, are almost continually on the move, and the greatest part of the territory of the United States, *i.e.*, the West, has been settled almost within a generation. Thus the effects of inharmony of climate cannot but act in a depressing manner upon the general system, impairing nutrition and development, and influencing the teeth in a greater or less degree. The same may be said of physical phenomena, meteorological conditions, etc., and of malaria, etc., from the soil. All these forces figure, with more or less importance and weight, in the drama that is being enacted in the destruction of the teeth in man, and are aided and abetted by others of which we are partially or totally ignorant.

ON THE PHENOMENA OF PAIN.

BY E. W. FOSTER, M.D., BOSTON.

(Continued from page 248.)

(B.) We come now to inquire what structural or what anatomical changes follow or precede the condition of pain,—changes which may frequently have pain both as a cause and a continued effect.

The question at present is full of difficulty, inasmuch as but few anatomical changes have been recorded by any one, which fact in a great measure is owing to the few resections of nerves obtained, and lack of a minute and thorough examination of such resections.

The few anatomical changes which have been observed stand out in bold relief from a hitherto obscure subject, and are all the more important, significant, and interesting.

Schuh found in the resection of a series of nerves for the relief of an obstinate case of facial neuralgia that it was possible to demonstrate disordered conditions of both the neurilemma and nerve tubes. Wedl also confirms these observations of Schuh. They found in this pathological condition that the neurilemma was hyperæmic and swollen, and that the interstitial tissue of the tubes presented a fine granular cloudiness, and the medulla itself also was changing to cloudiness, and crumbling. Not all the nerve tubes within the neurilemma in this case were thus metamorphosed; for alongside of these some were observed in a perfectly normal condition; thus the lowering of the nerve function was confined in these cases to only a few of the nerve tubes composing the main trunk. Further, in the course of long-protracted pain, severe in nature, as in some chronic neuralgias, from whatever cause, resected portions of the sheath or neurilemma revealed dark or pigmented spots, granular in form, and highly refractive; the same were also found in the body of the nerve. In some cases, Wedl found the grains protruding from the severed ends of the nerve tubes to be quite large, glittering, and granular, like those found in the neurilemma. Again, they appeared as minute grains, grouped together as before, and we should say in appearance not unlike fish spawn. The axis-cylinders were similarly affected. In one case these grains were found arranged in a longitudinal direction, and precisely as some of us may have seen in specimens of the so-called intrinsic calcification of the dental pulp.

These highly refractive little bodies above alluded to were entirely soluble in hydrochloric acid, showing them to be calcareous. Now, these which Salter has called "calcification islands," and found in the dental, are like those which Schuh and Wedl found in the facial nerve, both being entirely soluble in hydrochloric acid, and to all intents are identical in composition.

Both Schuh and Wedl found that, carried to its full extent, this process finally obliterated the nerve-medulla, and the latter quotes Rosenthal as having observed in a resected branch of the facial nerve knotty swellings composed of connective tissue and interposed nerve fibers, which are similar to knots met with in divided nerves after an amputation. These swellings have also been found at the termini of the dental branches of the fifth nerve after frequent and unskillful extractions of the teeth, and it has been suggested that they are the cause of many chronic neuralgias.

In a remarkable case reported by Prof. Wedl a few years ago, the autopsy revealed an evident pathological change, even in the very body of the Gasserian ganglion, on both sides of which were presented numerous calcareous grains of various forms. Even the ganglionic cells contained an abundance of pigmented deposits, and on the affected side of the ganglion was presented a noticeable swelling, and the blood-vessels in the connective tissue were highly congested. All this pointed without doubt to a previous exudative process in the ganglion itself.

Therefore, from the above observations, made by careful observers, this inter-granular deposit in nerves and their sheaths is due to inflammation, which in turn is generally due to pain, especially if pain is long continued, as in the case of chronic neuralgias. Pain is reflex from the nature of its phenomena, and by pouring in upon the ganglion a long-continued report, even from some of its terminal branches, very often the dental, the ganglion itself, it seems, may take on the condition of neuritis, and so pain; and its tears of suffering, profuse it may be as Niobe's, are turned to stone. All this we say was due primarily to the *irradiation* of pain, and lastly, was itself the cause of still further irradiation along other sensitive nerves; and the motor nerves in turn responded to the efflux, in numberless twitchings, spasms, and contortions of the muscles.

With regard to this calcareous deposit found in painful, resected nerves, we can see how, under a favorable pathological condition, it might be aggregated by congestion and inflammation, and by tumefaction, producing pressure; this pressure, at the location of pain, or even further on, would cause the arrest of any lime current, so to speak, which was going forward.

This appears true of the fifth nerve; but shall we not say in explanation of these lime granules found in others that these nerves are lime carriers as well? Are not all sensitive nerves repairers of bones and teeth? Is not, indeed, this calcareous product, which is now pathological, at other times physiological, and produced as now in the nerve itself, becoming at last differentiated as we see it in enamel and dentine, as wrought out upon the basement membrane? So pain, as a product of pathological action, may also be a stimulant or incentive to increased physiological action.

Yet we know not further, by what subtle chemistry lime becomes differentiated into tooth-bone, enamel, and true bone, each differing, yet so similar.

But it would appear that this process can be arrested as well as accelerated by pain and inflammation, and that any efferent nerve can be made to confess what it has in its burden. Thus, injury to a nerve from any source whatever, if carried to the point of continued pain and inflammation, may be sufficient—perhaps in every case, more or less—to induce the interstitial deposit of calcareous granules in certain, or indeed all portions of the nerve. By reason of such obstruction and decrease of functional power, resulting in pain and inflammation, the former, as pain, would be reflected back upon the smaller or greater ganglionic centers, and the latter, as inflammation, would follow in two ways: first, as congestive inflammation of the blood-vessels, and second, as neuritis, or inflammation of the nerve itself.

From the character of pain in general we must conclude that it is the result, as it may also be the cause, of a perversion of nervous function; or an inferior quality of nerve manifestation; or still further, a dynamic disturbance of nervous force, due to the lowering of functional activity, as Anstie and some others hold. Heretofore, pain was held by most writers on this subject to be a true hyperæsthesia of the nerve,—a manifestation of exalted functional power, or of nervous sensibility, imparting this state by contact or sympathy to other sensory nerves, both near and remote.

From the significant language of such changes as have already been observed, which are shown to be the result of pathological action, it must again appear, I think, that pain, as a result, is most certainly not the product of a nerve exalted in health; for if a nerve is obstructed or injured, and it quivers with pain and insult the whole length of its tract, it cannot be said to have on an exaltation of true power and function, since it has less; nor would this state be the result of hyperæsthesia, because part of the tubes at least in the sheath might be unable to act at all, and the rest, by reason of overcharge of force, would be weakened and reduced in functional power by such overburdens and pressure. Hence they break down, cry out in agony, or burst forth at last into the idiotic laugh of insanity. Pressure, therefore, by congestion and tumefaction of its own or neighboring vessels, or pressure by other and accidental means, are the most common causes of nerve-pain. And any serious overcharge of the nerve is also as true a sense of pressure as in any other condition; but this pressure results in pain only when some portion or all of the nerve is weakened in function by such obstruction, or by its own inflamed and congested membranes. For instance, many of the most severe varieties of cephalgia, neuralgia, or dentalgia are due to pressure by congestion, or thickening of the outer membranes, especially where branches of the sensitive fifth nerve traverse long, bony canals, as in the infraorbital, alveolar, malar, and other portions of the skull, there causing pain and other neuritive disturbances.

We may here remark, that the reason why "toothache," so called, is such an agonizing pain when at its height is because of not only the long distance traversed in bone by the various nerve branches that finally reach the teeth, but in the pulp-chamber of the tooth itself. The walls being unyielding, there is, in case of high congestion, a corresponding pressure upon the sensitive nervous filaments within, and pain follows, because in this case the pulp has no room to expand with its congested vessels. Here, however, in this as in other places which may be cited, pain may be the means indirectly, it is true, but nevertheless sure, of its own destruction, as we have shown. For it not unfrequently happens that in a sudden and severely painful congestion in the tooth the pain quite suddenly ceases, for the rush of blood has been so great and continuous, and the membranes so swollen with the stream, that just here, as the nerve enters the minute orifice in the apical foramen of the root, most truly it has had its very life choked out, and no more pain is reported from within the tooth by this branch; the external membranes of the tooth alone, with their infinite nervous plexuses, report the pain they feel.

Further, that pain is a report of disorder, perversion, and molecular disturbance of sensitive nerves, finds confirmation in the sorrowful list of chronic victims that pain has enthralled. The anæmic, the depressed, the enfeebled, the worn-out, the rheumatic, the gouty, and the legion of other states of weakness in which pain can physically manifest itself, all these show conclusively that pain, intrinsically, is not born of ease, but *disease;* not of health, but of *unhealth;* not of rest, but of *unrest.* Pain, as to its location of cause, may be either peripheral or central; the first, as in organic changes of soft or hard parts in continuity, as tumors near the brain-base, and bony tumors in the pulp-cavity of the teeth, or in other bony canals; central causes would indicate the seat of disturbance to be in the brain, or in the larger ganglia, or in the spinal cord, in the membranous sheaths of which parts have already been found morbific deposits.

Pain, as a symptom, is one of constantly varying condition, and we may best leave this part of its symptomatic details to one's own personal experience, from which it will be found, I presume, that pain is set on foot, first by external causes, that is, external to the nerve itself, and is continued by natural causes obstructing the normal current of nervous force. So that anything that hurts, or by persistence has power to prevent or change the true and healthy function of a sensory nerve, will be reported as pain by that nerve; and as none but sensory nerves can report pain or other sensations, the burden of all our pleasures and our pains alike falls on them. These light the smile of joy; 'tis they who feel, and by reflection of this feeling to motor nerves, cause to grasp the hand of friendship. And while they are bearers, heralds, or reporters of all our emotions, the tell-tale branches, chains, and ganglia of the sympathetic system, more or less interest the whole family of organs with the news; co-ordinating the general intelligence of all concerning the weal or woe of the entire body, while the great ganglionic brain above presides over, controls, directs, and interprets all. Without the powers and possibilities of these wonderful functions, as perfected in his endowments, man could not exist as such, but would drop by the gravity of natural laws to a lower order. Now, however, with these organs of sensibility and co-ordination, coupled with and terminating as efferent nerves in the large and highly convoluted brain, man is placed, and triumphantly held there without fear of dethronement, save by himself, as the head and crown of the whole animal creation.

(To be continued.)

WHAT IS CELLULOID CHEMICALLY?

Extract of a lecture delivered during the preliminary course, October, 1876, by Charles J. Essig, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy in the Pennsylvania College of Dental Surgery.

[Reported by A. B. Abell, M.D., D.D.S., Demonstrator.]

Before going into a description of the manipulation by which an artificial denture is constructed of this material, I deem it no more than proper that you should have a correct knowledge of the chemical and physical properties of the compound.

As you may infer from its name, this substance is derived from cellulose, a woody fiber, constituting the framework or foundation of plants.

Linen, cotton-wool, hemp, etc., are examples of cellulose. For the manufacture of celluloid, the cellulose is first converted into paper; hemp is the form of cellulose employed for this purpose, because it has been found to make the strongest paper, and the stronger the paper the better the celluloid.

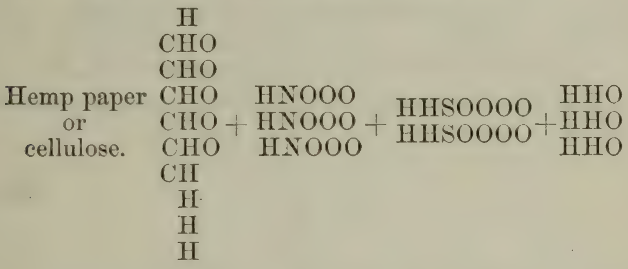
The hemp is first converted into paper in the usual way by paper machines. Now, you will bear in mind that by this process the form of the material undergoes a physical change only, while chemically it remains the same, viz., nearly pure cellulose, and has a formula of $C_6H_{10}O_5$. But now we come to a part of the process in which the cellulose, now in the form of hemp paper, undergoes a chemical change, and is converted into pyroxylin.

This change, technically known as "conversion," is effected by immersing the hemp paper in a strong mixture of nitric and sulphuric acids for a sufficient length of time, when it is removed from the acids and washed thoroughly.

It is now still in the form of paper, but its weight will be found to have increased about seventy per cent., and to have become highly explosive, taking fire at about 300° F.

Pyroxylin, then, is the chief ingredient in celluloid. It belongs to what is known as the nitro-substitution products, and has a formula of $C_6H_7\,3(NO_2)O_5$. Now, you will observe that the cellulose, during its conversion, has had three atoms of hydrogen displaced by three molecules of the radical NO_2.

In order that you may fully understand the rationale of this reaction, I will dissect these formulæ upon the blackboard; you will, by this means, get the full significance of the figures at the right of the symbols, which we are thus enabled to dispense with.

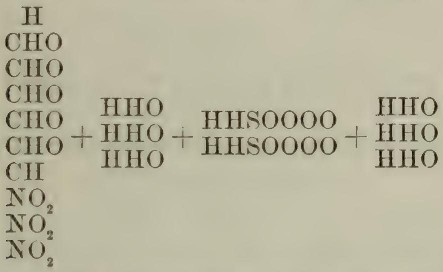


$$\begin{matrix}\text{Hemp paper}\\ \text{or}\\ \text{cellulose.}\end{matrix}\ \begin{matrix}\mathrm{H}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CH}\\ \mathrm{H}\\ \mathrm{H}\\ \mathrm{H}\end{matrix} + \begin{matrix}\mathrm{HNOOO}\\ \mathrm{HNOOO}\\ \mathrm{HNOOO}\end{matrix} + \begin{matrix}\mathrm{HHSOOOO}\\ \mathrm{HHSOOOO}\end{matrix} + \begin{matrix}\mathrm{HHO}\\ \mathrm{HHO}\\ \mathrm{HHO}\end{matrix}$$

Here we have one molecule of cellulose plus three molecules of nitric acid, plus two molecules of sulphuric acid, plus three molecules of water.

The sulphuric acid present in this formula takes no direct part in the reaction; it is only there to reinforce the nitric acid, by taking up the water which is formed during the interchange, and for which it possesses a strong affinity.

To demonstrate this more clearly, I will now place upon the board formulæ showing the interchange which takes place:



$$\begin{matrix}\mathrm{H}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CHO}\\ \mathrm{CH}\\ \mathrm{NO_2}\\ \mathrm{NO_2}\\ \mathrm{NO_2}\end{matrix} + \begin{matrix}\mathrm{HHO}\\ \mathrm{HHO}\\ \mathrm{HHO}\end{matrix} + \begin{matrix}\mathrm{HHSOOOO}\\ \mathrm{HHSOOOO}\end{matrix} + \begin{matrix}\mathrm{HHO}\\ \mathrm{HHO}\\ \mathrm{HHO}\end{matrix}$$

Here, you see, as the molecules of nitric acid are each broken up by the loss of their nitrogen and two atoms of oxygen (constituting the radical NO_2), we have HO as the remnant of what before the reaction was HNOOO (nitric acid). Now, this radical NO_2 has an atomicity of one, consequently each molecule of the radical can displace but one atom of hydrogen. The liberated atoms of hydrogen unite with the remnants of the nitric acid formula, and water is formed which, were it not for the sulphuric acid present, would dilute the nitric acid to such an extent that the conversion would not be complete. Now I will place upon the board an equation showing the change which has taken place, and we now return to the ordinary way of writing it.

Before the conversion, $C_6H_{10}O_5 + 3\,HNO_3 + 2\,H_2SO_4 + 3\,H_2O =$
After conversion, $C_6H_7 3\,(NO_2)\,O_5 + 2\,H_2SO_4 + 6\,H_2O$.

Now, you will notice by the specimen which I have before you that the pyroxylin is still in the form of paper, and is apparently unchanged; but, as we have seen, it has become highly explosive, and has increased in weight. This pyroxylin, which is the chief constituent of celluloid, is now reduced to a pulp in a machine similar to that used in paper-making; a thorough mixture is then made of

Pyroxylin, 100 parts;
Camphor, 40 parts;
Oxide of zinc, 2 parts;
Vermilion, 0.6 parts.

Some alcohol is used to soften the camphor. The mass is now put under a hydraulic pressure of two thousand pounds to the square inch. The cylinders in which it is pressed have a small orifice in the side near the bottom, and when pressure is made the celluloid is forced out through this orifice.

The immense pressure is to condense or solidify the celluloid, and as it is forced out it is cut off in pieces of the proper size, and moulded by pressure and heat to the forms in which we receive it; at this point the blanks are still soft, and require to be seasoned; this requires about two months, during which time they are kept in a room at a temperature of 160° F.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 265.)

Dr. Wm. Jarvie, Jr. Dr. Marvin called on me this morning to express regrets at not being able to be present to-night. He was much interested in the subject of this paper, and he took it to read during the day, and this evening returned it with the following written comments:

Dr. C. A. Marvin.—In discussing the paper presented by Dr. Cutler, I am confronted by a difficulty at the very outset which I will merely name and pass. I allude to the cases which he has described as having come under his observation in which both transplantation and replantation have been performed, and with signal success. It is not for me to call in question the doctor's assertions, and so throw doubt, even constructively, upon his veracity. He has undoubtedly seen every case referred to, and thinks he has clearly perceived evidence to warrant the conclusions at which he has arrived. But I must be allowed to express my dissent from those conclusions, and add for the doctor that I think he is mistaken. It is deemed a final argument upon the character of structure or tissue when the microscope is referred to, and its revelations are adduced in proof of some assumed position. And so it might be if the eye above the microscope were always as correct as the instrument. Unfortunately this is not so. Mistakes are often made by those who look through the microscope; and unless the marvelous difference in appearance, when objects are seen in entirety and in normal size, or when magnified details are examined, is familiar to the beholder, the chances are that he *will* mistake, and mistake very often.

Gentlemen present who are accustomed to the use of this most valuable instrument will bear me out in this statement. Instances might be cited just here, were it necessary, to prove it,—instances where egregious errors in diagnosis followed microscopical examination. I do not feel bound, therefore, to do more than accord to the author of this paper an honest purpose in his statement of what he thinks are proven facts in the cases he has reported.

As to the deposit of new osseous tissue upon the external surface of the root of a transplanted tooth, I do not believe it was ever done; for I do not believe that the exudations or secretions of the "alveolar membrane," as the doctor calls it (by which I understand him to mean the lining membrane of the alveolus), are osseous in the least degree. If they were, I for one would shout "Hallelujah!" for instantly would be put in my hands a certain cure for that vexatious disease, "luxation of the tooth." It would consist simply in securing by ligatures the loosened teeth, and by the appropriate means, whatever they were, giving the membrane notice that the time had come for it to give forth its osseous exudation, and in a few weeks the result would be solid teeth, the intervening space having all been filled up by this new deposit of osseous tissue supplied by the parental membrane. Would it were so, gentlemen! would it were so! But unfortunately we have found it not so. At least this membrane will not do this kind service at my request. Nor can it be asserted with any show of propriety that this "alveolar membrane" performs a service for a transplanted tooth which it will not do for the natural one. Every principle of affinity, of sympathy of attachment, of fostering care, would urge the generous membrane to do its utmost for its kin; certainly as much as for a stranger, and that stranger a waif of a tooth, which has been carried and kicked about for months and passed through many unholy hands.

Another position taken by the author I dissent from. He says the process following a fractured bone (in the matter of restoration) is the same as that following the extraction of a tooth, in the matter of filling up the cavity. I deem them entirely distinct and quite dissimilar. If the processes were identical, and the former position of the paper correct, we should have not only the osseous deposit from the inside of the periosteum gradually cementing together the broken bone, and even increasing its diameter at that point, as is the case, but we should look for an osseous deposit on the outside of the periosteum as well; for when once fairly set in operation in the curative process there could be no good reason for its working on one side and resting on the other. The paper holds that the wonderful membrane already quoted. at the time of "tooth eruption developed the cement on the one hand and the alveolus on the other, a dual process."

While the new osseous matter is given out in the case of the broken bone, the process is carried forward through the new creative instrumentality of the periosteum working in the natural and very effective way of its appointment. It covers a bone, nourishes a bone, repairs a bone, and gives its strict attention to a bone first, last, and all the time. Besides, it must be remembered that when a bone is broken both parts are still vital, are still connected with the organism, and are equally endowed with the power of forming a reunion. They come together, therefore, in a mutually favorable condition. They reach out for each other, so to speak, weep towards each other till finally they mingle tears and embrace and remarry.

When a tooth has been extracted it has lost all vitality, and if replaced in the socket whence it came out is a foreign body. So the doctor says later on in his paper. But he also asserts that although a foreign body, it is welcomed by the friendly membrane aforesaid, which at once begins its deposit of osseous matter. and this osseous deposit clings to the root of the strange tooth by some law of "atomic polarity" and "electric affinity," and I know not what else.

I also take exception to the definition of healing by first intention implied in the paper, when it is applied to the gradual filling up of the socket after extraction, but time will not admit of my pursuing that branch of the subject.

I hold that the retention of a replanted tooth, or a transplanted tooth in the jaw, is altogether mechanical, a closure or contraction of the alveolar walls, and that no renewed vital connection ever takes place. The tooth is tolerated. It fits its socket, if it came out of it, and after the effect of the injury from the operation has passed away it remains therein as a mere piece of mechanical skill or adaptation. Having no vital connection, it can receive no injury except through mechanical violence. The parts around it not being vitally connected with it, and having recovered from the injury of the extracting operation, as has been said, also receive no injury except mechanically. Hence a tooth may remain so inserted for a period and do good service, even becoming firm in the socket and requiring much force to remove it.

The subject is well worth attention. If a tooth can be extracted, cleansed, and replaced and be useful, it is our duty to examine this matter and avail ourselves of this possibility. But the danger is in going too far in our claims and subjecting ourselves to the charge of hugging "science run mad." Nay, we may get mad ourselves.

Better is it by far to remove a diseased tooth if it can be replaced as is claimed, than to pursue a long, painful course of treatment with a doubtful result.

I therefore am prepared to hail progress in any direction, but let it be attended by good common sense.

Dr. W. H. Atkinson. I think I remember making the remark on a former occasion similar to this that we were in deep water, and really it seems to me that such is our situation now.

If I were called upon and were able to sift out the gratuitous statements from the correct doctrines pronounced in the paper, there would be little room left for criticism, as it is constituted of the two.

So far as the inference of Dr. Cutler is concerned that this new formation came from the "periosteum," so called, his paper shows that there cannot be any periosteum there, for he says that they drilled out the "plug of bone" that was between the two small roots of the bicuspid teeth in two cases that he related, so as to have room for the roots of the teeth that were "picked up" and put in their places.

Let us try and see how that corresponds with the deduction made by Dr. Marvin, that this bond of union "must necessarily have been supplied by the periosteum"—that was not there. Dr. Cutler's misapprehension was in this: that he has not studied closely enough what the process is, either of the production or the reproduction of tissues. He does not take into account that there is a hystoplastic and then a hystoclastic process of preparing the material that forms the bond of union under the law of formation, which holds the material in a regular aggregation of elements sometimes called cells, sometimes molecules, sometimes granules, which possess the affinity enabling them to unite with each other.

Now, this sort of churning process of the preparation of the pabulum out of which tissues are originally formed, and by which they are maintained through the law of production, and by which they are also reproduced (because the law of production and reproduction, and not only the law but the process, are the same), is the same in every single instance.

You don't carry the old bricks and build them into the new wall; we have those old bricks ground up by the process of alternate hystolysis and hystogenesis in the circulation throughout the entire curriculum, and brought back in a new preparation of pabulum by this hystoplastic and hystoclastic process; and by this building-up and breaking-down process you get your new preparation by which to effect the union.

Now, where are we? Just in a good state to learn. This inference of Dr. Cutler depends upon whether he saw what he thought he did,—a union of the desiccated material of the old tooth that had been out, as he records in one instance, seven years. It simply depends upon whether that is true or not. And as the representation is made so learnedly by another speaker, that "it requires the eye behind the microscope to be properly trained," I say it only needs the eye of the tyro in microscopy with properly-prepared glasses and specimens to see whether there is a union between the old and the new. The ability to discern such formations, if they are to be found, lies within the ability of a four-weeks' pupil in microscopy.

Now as to the reliability of Dr. Cutler's observations: He pronounces dogmatically. There are some things which he had better not have said. He says there is such a thing as union between hypertrophied cementum and the osseous tissue of the alveolar process. Had he known the law of formation of tissues out of pabulum, or "formless material," and then the classification of those materials by knowing the process of formation, he could not have made such a mistake. The ground is utterly untenable.

I have made many examinations to test that matter, for I have been told repeatedly by patients and dentists that they had teeth grown to the jaw, and that they had been unable to extract them because they had thus grown to the jaw, meaning that a consolidation had actually taken place between the hypertrophied cementum of the root and the bone of the alveolar process.

I am astonished at Dr. Cutler, for I know him to be a perfectly straightforward, honest man, and a very good observer as far as his observations go. But these have been made almost entirely without the correcting suggestions at hand of sharp pupils, or brethren engaged in the same line of research, so that he has jumped at some conclusions that I deem entirely unwarrantable; one of which is that a ruptured pulp can never reunite by being replanted. We have numerous instances of that having been proved positively where the teeth have been extracted accidentally before they were completely developed; and in other instances teeth have been extracted, rupturing the pulp-connections, the tooth replaced, after which the roots were developed to completeness.

Now, I have not had the good fortune to have such accommodating cases as to allow me to make such discoveries by the adequate examinations after death! I believe I have four or five teeth in the mouths of patients which have been extracted and returned, and which have living pulps in them. Those teeth were fully formed in adults.

As to the impossibility of the reproduction of tissues, we must know more about that and be more at home in observation before we pronounce so positively what is possible and what is not possible. The author of the paper certainly makes a blunder when he says that an injection cannot be sent wherever a blood-vessel goes. If the pulp be dead and the chamber empty, I don't see how you are going to get such an amount of injective force upon that cavity through the foramen of the root as to produce the staining that he speaks of in the tubules of the dentine. I don't understand that this is a possibility; and there I am taking the ground of making a deduction, but not, I think, as unwarrantable a deduction as he made when he said fluid could not be injected where blood could go. We have some finer injections than blood-corpuscles, and this is the real point rather than that the measure of the finest capillaries is the limit of size of the red corpuscles of blood belonging to the class of animals to which the capillaries pertain. The smallest capillary belonging to any animal will be just big enough to allow a series of blood-corpuscles to follow each other.

Dr. Wm. Jarvie, Jr. Dr. Atkinson has vouched for the veracity and intelligence of Dr. Cutler, and he tells us that a mere tyro in microscopy, or a four-weeks' student, would be able to tell the structure of bone under the instrument; and yet Dr. Cutler says that in one case the nodules *were* seen, and in the other case both the lacunæ and canaliculi were formed.

Dr. E. A. Bogue. Lacunæ and canaliculi are always present in true bone, and if they were present in the nodules described upon the roots of these teeth which were extracted after being replanted a long while, could he not detect what their real character was?

Dr. W. H. Atkinson. I think he did detect it. The question is simply this: He does not distinctly state that he made the examinations that were necessary to reveal the amount of coalescence between the original formation of the old teeth and the new deposit that was the bond of union between the old and the new. I am not disputing Dr. Cutler's accuracy of observation; only suspecting it.

Dr. S. G. Perry. I was thinking possibly Dr. Cutler made the mistake of confounding hypertrophied cementum and bone-tissue. The cementum and the bone-tissue are so nearly alike that it would take a trained eye to detect the difference.

Dr. W. H. Atkinson. My own impression is that he did not make a distinction between cement-cells and bone-cells. I think he meant cement-cells when he said bone-cells. But that is only an inference from my knowledge of the man and from the paper.

Dr. J. B. Rich. I did not hear the paper read, and from the remarks upon it I regret very much my absence during the reading. Dr. Atkinson spoke of some propositions put forth and certain statements made in that paper, which do not appear to have been exactly clear when they ought to have been perfectly clear, and which, as Dr. Atkinson said, could have been made perfectly so by the investigations of the merest tyro in microscopy. There certainly ought to be no mistakes made by men who plunge into science. In this case it would have been a very simple thing to ascertain by the microscope whether there was the bond of union. The examination of the bone-tissues is what in microscopy would be called a very simple thing. Everybody who pretends to put forth theories and statements upon such subjects should be clear in those statements, and not only that, but the objects upon which such impressions are formed ought to accompany the paper.

Dr. J. Smith Dodge. Permit me to state a case of office practice in connection with this subject. The incident happened many years since. A young woman came rushing into my office almost insane with toothache, and wanted the tooth removed. It was an upper canine, about one-quarter gone and the nerve exposed. Almost as soon as I extracted the tooth she cried, "I am ruined, I am ruined! my profession is gone! Do you hear how I speak with that tooth out?" She was an actress. I filed away a part of the crown, filled it, and replaced the tooth in her mouth. She called some months afterwards, with the tooth strong and useful, appearing perfectly good. I think I cleaned out the root perfectly and left it empty.

Dr. W. H. Dwinelle. Are we to accept this, to me, strange doctrine, as laid before us to-night? It seems to me that we have left the extraordinary statements of this paper and gone off into a scientific discussion as to how this living bone was reproduced upon the old, without considering whether the premises are correct or not.

I want to know if we are to accept as good doctrine the idea that old dead teeth, which have been extracted for years and been carried about in people's pockets, can be transplanted into the sockets of the teeth, and there accepted and revivified and brought to life again. It seems to me extraordinary, and especially when the writer of the paper states furthermore that even ivory itself is capable of being entertained in the same way. If this is the case, I don't know but that we might introduce porcelain teeth, and that the periosteum would be capable of depositing upon them its cementum, its canaliculi and lacunæ, and, for aught I know, its dentine.

Dr. Wm. Jarvie, Jr. I have no doubt that there are many successful cases of replantation, and that the teeth remain firm in their sockets without annoyance to the patients. I hear quite frequently from one case which occurred some twelve years ago. The major of a New York regiment had a second superior bicuspid extracted by mistake, which was not discovered till several hours afterwards. The aching tooth, the first bicuspid, was then extracted, and search made for the sound tooth. It was found in the dirt, washed, and replaced in the socket. On closing the jaws the teeth did not occlude rightly, and on examination it was found that the tooth was turned half round, the lingual cusp being where the labial cusp should be. The tooth was again removed and put back right. Three years ago an alveolar abscess formed at the root of that tooth,—the tooth being perfectly sound. I drilled through the crown, cured the abscess, and filled the roots. The tooth is now as firm as any in the mouth. I have seen it within a week.

Therefore, that one feature of the paper I readily accept. But what I cannot bring my mind to accept is, that a tooth which has been out of the mouth for years can be put into another mouth, the root being filed and trimmed to fit the socket, the only care taken being to have it small enough, and cementum be deposited upon the root of that tooth; yea, even an anchylosis established between the socket and the root. I do not know of any law of nature whatever that will bring about such a result.

Dr. W. H. Dwinelle. Gentlemen, it is simply ridiculous for us to discuss this paper. The writer refers to taking teeth out of skulls and transplanting them, and nature taking kindly to them and depositing a new crust of cement upon them, with all the peculiarities of cementum, with its bone-cells and canaliculi and lacunæ. Why, we must invent new terms, we must remodel our ideas of common sense, to entertain a paper like this. But that living teeth can be replanted and transplanted while they are living is very possible, and we believe it.

Dr. Tennyson. I have seen a case where a number of teeth were retained in the mouth and could be removed at will and put back again, and I was assured by the party who owned them that they were as useful as teeth could be under the circumstances. They gave no trouble, and she could masticate with them.

Dr. W. H. Atkinson. I want to call attention to another point. That is, the difference between law and mere blundering misapprehension of law, by which we make our deductions stand for law, as we frequently do to our sorrow and chagrin. Where the law is, I am ready to bow to it, for where the law is there is the Lord, and that is the power that governs. When we have demonstrated what the law is, that is the power which enables us to diagnose and to prognose our cases.

Dr. J. B. Rich. It has often occurred to me that we ought to be very careful about receiving statements where they are not accompanied by proof. I have noticed one peculiar feature about human nature, which may not be considered dishonest, and that is, a fondness for stating a case that never existed except in imagination. I know I have heard many such cases in dental meetings, and at one time I had a habit of scrutinizing such cases when presented, and, being a good cross-questioner, I have often made a bitter enemy of a man by making him confess that it was drawn from imagination. I think we must make some allowance for a paper like this. I find that Dr. Atkinson's faith in the paper depends upon his knowledge of and belief in the man, although he don't seem to believe in the doctrines of the paper at all.

Adjourned.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

The regular monthly meeting of this society was held at the Pennsylvania Dental College, on Tuesday evening, January 9th, 1877. The Committee on Mechanical Dentistry made the following report:

In the matter of cases for artificial teeth nothing new has been brought before the profession.

Celluloid has been much improved in color and texture, and the liability to shrinkage, warpage, and disposition to change its shape, after being moulded, appears to have been overcome by the proper seasoning of the plates or blanks. For entire sets, either for the upper or lower jaw, or both, they deem it superior to vulcanite; being quite as strong, quite as light, of a more desirable color, more cleanly, and more expeditiously worked.

The *color*, however, does not seem to be abiding, since after it is worn the oral secretions seem to have the effect of changing this. They would suggest to the manufacturers the propriety of making experiments in this direction with a view of obtaining a more permanent or lasting color, since their efforts in overcoming its early defects have been so successful.

For *partial cases* they think vulcanite preferable (as a cheap base) to celluloid, especially in cases of "close bite," or, to be more explicit, in those cases where the tooth supplied requires the plate to be so cut away from the close antagonism of the teeth that much of the strength of both the artificial tooth and plate have to be reduced, making it necessary to use a *plate tooth* with the heel or extension of gold extended back and moulded into the substance of the vulcanite; the force necessary to mould the celluloid being entirely inadmissible in these cases. This does not refer, however, to the supplying of the four upper incisors in the most ordinary cases, where they think celluloid preferable to vulcanite.

In cases of great absorption of the lower jaw, where no ridge is left to give stability to the plate, they deem Weston's metal a valuable base, as by its weight the plate is retained, where from their lightness celluloid and vulcanite seem inadmissible.

For upper or lower sets, entire or for full dentures, nothing approaches in their estimation the continuous-gum work for cleanliness, beauty, artistic finish or display, and the exhibition of skill, taste, and accurate copying from nature. The *cost* of this style of work, however, puts it out of the reach of the masses, and because of this the committee believe it has not been more generally adopted.

Gold-plate work, used either with clasps or with atmospheric air-chambers for the retention of the substitutes, has no equal in supplying the lost dental organs in *partial cases.*

Improvements can be made by manufacturers in the gum-section teeth they have on sale. As a rule the *cuspids* or eye-teeth are *too small and narrow*, and not sufficiently prominent. These teeth should be fully as wide as the central incisors, and they are observed to be generally slightly darker in color than the incisors and bicuspids of the same set in the natural teeth.

In their efforts to imitate the irregularities found in the natural dentures manufacturers of artificial teeth have overlooked a self-evident fact, viz., that whenever these occur they are due to a crowded condition of the teeth from *a lack of room* in the jaw, so that when these block sections are offered for sale with *separations* between the *overlapping* or *crowded teeth* it is a flagrant error, and one which stamps the very work which they endeavored to make *natural* as *false* in the extreme.

Improvements may also be made in the cutting edges of artificial teeth. We have to supply teeth, as a rule, for persons in middle age and advanced life, and these delicate edges are worn off by this time of life in the natural denture, so that to supply substitutes *with* these fine chiseled edges unimpaired would likewise cause a suspicion of *reality* in the beholder. It is true these edges may be ground off, but the set thus mutilated never has that life-like appearance that it is possible to give them before the teeth are mounted on the base.

The bicuspid teeth of these block sections are likewise susceptible to improvement. As a rule they are not sufficiently large, nor do their masticating surfaces approximate sufficiently in shape and *depth of cut* to the natural teeth of this class. This depth of cut would permit a better antagonism, or occlusion with the lower teeth, give a better triturating surface, afford a more natural appearance, and create a better division in the difference of size between these and the eye-teeth.

The committee would likewise suggest that improvements could be made in artificial crowns for pivoting. If the holes in the incisors and cuspids were bored entirely through instead of leaving the thin partition of "tooth body" remaining, as they are now manufactured, this would allow of these teeth being used for the "old style" of pivoting as well as for the different styles suggested by different operators during the past few years, whereby they can be attached to the natural roots by means of metallic pivots, or screws, or by the old plan of compressed hickory pivot-wood. In nine-tenths of the cases where the old style wood pivot is used, the palatine aspects of these teeth have to be ground away (thereby exposing the wood pivot) to permit proper occlusion of the teeth, so that whether this be done by the manufacturer in the first instance or by the dentist in the second it does not much matter, while if done by the manufacturer it permits of these teeth being used in a much larger number of cases and by more numerous devices. The committee do not consider that the teeth would be materially weakened by having this pivot hole drilled entirely through.

The plan or operation of pivoting bicuspids or molars has of late years been suggested, and as this operation can be accomplished in *less time* and at much *less cost* than the restoration by contour with gold, as well as presenting a more natural appearance, and in very many cases serving all the purposes of mastication in the best possible manner for an artificial tooth, the committee would suggest to manufacturers to keep on sale a larger and better selection of teeth of these classes to meet the wants of operators who make use of these devices to supply the lost organs. Much time is often wasted by the dentist in selecting a pivot tooth for a special case, where size, shape, and shade have all to be considered. If manufacturers have not already done this, pivot teeth put up in sets of two and four and six would be a great aid in this direction; and could a cheap device be made by them for retaining these teeth *in situ* to prevent them from being scattered about in the drawer or tray, instead of the card wax now in use, which does not "fill the bill" for these teeth, it would be a great saving of time, which is of the greatest importance to the dentist.

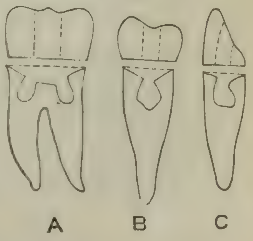
All of which is respectfully submitted by the committee.

Discussion.

Dr. E. H. Neall thought the report contained some valuable suggestions. Thought the idea of having the hole drilled through in pivot teeth a good one, and gave it his unqualified indorsement. He had often been obliged to use Mack's crowns, but these he found very frail, and was often afraid to tighten up the screw by which it was attached to the root for fear of crushing the thin partition of porcelain which this passed through. He likewise found the screws which were used with these teeth often too small, and consequently inadequate for their support.

Dr. Spencer Roberts preferred celluloid to vulcanite. In his hands it had lasted as well and had given as much satisfaction as vulcanite, and was much more pleasant to work. He agreed with the report in its not being as applicable in partial cases of "close bite" as vulcanite, but for this purpose held gold plate as the best. In the large majority of cases he thought all that could be done with rubber could be done with celluloid. He had experienced difficulty with the metallic air-chamber patterns of the depots. The metal of which they were composed he found too stiff, so that in placing it on to the plaster model this was often badly mutilated. He regarded the suggestion of the report for drilling the hole entirely through in pivot teeth most favorably. In a large number of these teeth the hole was so shallow that it gave no stability to the work, while if the hole was entirely through the case could be made much stronger. He had frequently to throw away teeth on this account, even after they had been fitted, and most frequently the wood pivot was exposed in grinding away the tooth to allow of the proper antagonism of the teeth. He had never used the new plans of metallic pivots and screws, but adhered to the old style of compressed hickory.

Dr. Ambler Tees being invited to speak on the subject said he favored this plan of having the holes in pivot teeth drilled through both in the incisor, cuspid, bicuspid, and molar pivot teeth. He delineated his plan of engrafting these teeth to the natural roots by the following diagrams on the blackboard. Applying the rubber dam, he prepares the root or roots for the reception of the crown by drilling little egg-shaped pits in them. These are filled in with Wood's fusible alloy and brought up full to the dotted lines as in A, B, and C. The crowns having been previously fitted are now warmed and applied, the surplus metal entering the pivot holes. Small pieces are then introduced through these pivot holes, and by means of an old instrument, which is warmed, these pieces are fused and



incorporated with that already packed into the roots; any surplus exuding about the sides being dressed off with files or with the corundum wheels and points of the dental engine.

Dr. W. H. Trueman spoke very favorably of pivot teeth with metallic pivots for roots badly decayed or irregular as to position, having inserted a large number by Dr. James B. Bean's method* with very satisfactory results. In badly-decayed roots he used a gold tube, when convenient, securing it by a few screw threads at the bottom and filling around with oxychloride covered with Hill's stopping. This he has found more serviceable than gold packed under the seeming disadvantage we usually encounter in these cases, while it decreased very materially the labor and expense. The gold plate covering the root entirely protects the filling, and when placed in position slightly warmed makes a better joint. When the cavity in the root is not large he dispenses with the tube, filling the cavity entirely with Hill's stopping, drilling a hole in the center, and proceeds to adapt the plate and tooth. When ready he barbs the pivot, and, adding a little more Hill's stopping, makes the tooth and pivot quite hot and presses it in position. He frequently pivots bicuspids by inserting a wire in the root and securing a tooth carved to fit over it by Hill's stopping. He has examined several which have done efficient service four or five years without requiring the least attention, and are still firmly in position.

Dr. G. W. Adams thought very little of the celluloid base. His experience with it had been unfavorable. He had used it for some time, but found the plates flaky and changing shape after being worn, many of which he had to make over on account of their not fitting the mouth. It had failed entirely in his hands, therefore he went back to rubber as a base. He would say, however, that his experience with it was when it was first offered to the profession, and he had heard that considerable improvement had been made by the manufacturers with it.

Dr. W. H. Roop thought favorably of celluloid. He had been able to secure accurate fits with this base, and had no fault to find with it. On removing it from the flask he used the precaution of casting some plaster within the plate, and finished up the palatine surface and outer rim with this plaster investment. He thought this kept the plate cool during this operation, and overcame the tendency it might have to warp from the heat of the hand and the friction of the files, scrapers, and rubber burs used for the purpose of finishing. He has never had but two or three cases to make over since he has been using it, and has had but few failures. He thinks the new plates are excellent in texture and color.

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* American Journal of Dental Science, vol. iii. (1869-70), or Harris's Principles and Practice, 10th edition, page 516.

Dr. A. V. Hartlevan never had any difficulty about securing correct fits with celluloid, but his experience with the material was that it changed shape after being worn.

Dr. Amos Wert saw so many opinions for and against celluloid, and had heard so many complaints of its warping, that he was disposed to leave well alone. He therefore continued to use vulcanite, and thereby escaped all the annoyances which these misfits in the celluloid occasioned.

The subject was then passed.

Dr. Tees, who had been invited by the Executive Committee, then exhibited to the society his forceps with lancet-beaks and also his rubber dam clamps.

The forceps he uses for the extraction of roots, especially those beneath the gums, taking the place of the alveolar forceps. The points of the beaks resemble lancets, and are insinuated between the neck of the root and the alveolar process. The inside of the beaks being highly polished, the root very often '*jumps out*' without any pulling whatever. These forceps have been in use by Dr. Tees for some time.

In describing his rubber dam clamps, he dwelt upon the utility of the dam and clamps in general, and said that the ordinary clamps were employed by the majority of dentists merely for the purpose of retaining the dam in position, after it had been successfully applied with a ligature, a very difficult and tedious operation in many instances; he had heard of dentists sometimes being over an hour in getting the dam around a tooth. The clamps he exhibited, he said, were so shaped that they acted as *vehicles* to convey the dam instantly and with facility around the necks of the teeth, in a great majority of operations. The beaks are *obtuse-angled* where they embrace the necks of the teeth, so that once on, the dam cannot slip back again, as is frequently the case with ordinary clamps. They are *broad* and *highly polished;* thus pressing the dam away and throwing light into the cavity.

For his clamps Dr. Tees said he preferred a *heavy medium* rubber dam;—there being three thicknesses for sale at the depots,—*thin*, *medium*, and *heavy*. These varied sometimes, the medium being heavier in some lots than in others, and the heavy being *thinner*. Either of these he preferred. The thin and heavy were both apt to tear in stretching the dam over the clamp.

His remarks elicited much interest and attention, and the utility of his appliances for the purposes claimed for them was generally admitted.

He then practically demonstrated, on the teeth of two of the students of the College who were present, the quickness and ease of applying the dam by means of these clamps. For molar teeth the largest size punch of the triplex rubber dam punch of the depots is used, and for bicuspids the second size. The rubber of a proper size is then placed upon a piece of walnut-wood and the hole punched. The flange of the clamp is passed through this hole in the dam, and the beaks of the clamp-forceps inserted in the bow of the clamp. Clamp-forceps without a lock-slide are preferable for this purpose. The dam is then folded neatly over the forceps, so as not to obstruct the sight, and the clamp applied to the tooth, just as the beaks of a pair of forceps are applied for the extraction of a tooth. The dam is then stretched over the tooth and beneath the flanges of the clamp, using both hands for that purpose. The rubber is then fastened back over the mouth and face, by means of the rubber dam buckle. For crown cavities it is not often necessary to pass the dam *between* the teeth, as it *hugs* the tooth sufficiently tight to exclude all moisture; but whenever necessary to do this, waxed floss-silk, or gilling-twine, will carry the dam between and around the necks of the teeth. In approximal cavities, two holes are punched in the dam, the clamp is applied to the posterior tooth, and a ligature to the anterior.

Dr. Tees also exhibited a root-clamp of his invention, which is admirably adapted to convey the rubber dam instantly around healthy and sound roots, which the dentist purposes either to fill or to engraft artificial crowns upon.

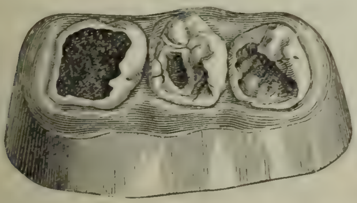
Before the meeting adjourned, a vote of thanks was unanimously tendered Dr. Tees.

The regular monthly meeting of the above association was held on Tuesday evening, March 13th, at the Pennsylvania Dental College.

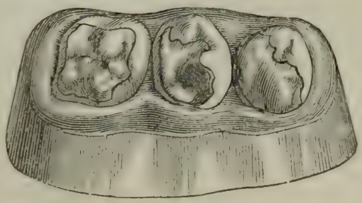
Prof. Chas. Essig presented some models of very badly decayed teeth which he said he had treated according to the plan or idea proposed by Dr. Bing, of Paris, France. Instead, however, of using a simple plate or disk with loops soldered to the under surface of the plate as proposed by Dr. Bing, he proceeded as follows: The contour of the tooth was restored in wax, after which an impression in plaster was taken, from which a model was made, and from these a die and matrix. With these plates were swaged, covering the defective parts of the teeth to be treated or filled, and on the inner surface of these plates loops of gold or platina wire were soldered. Gutta-percha or Hill's stopping was now softened and carefully packed on these plates and through these loops, and the tooth likewise filled with gutta-percha. The plates were now put in the mouth over the teeth they were intended to cover, and by means of a heated instrument the gutta-percha in the teeth and on the plate was softened and united, and the edges of the plate burnished down to the remains of the natural tooth. When finished the operation presented the appearance of a well-executed and laborious gold filling. Dr. Essig stated that the material (Hill's stopping) was well known as most excellent for the preservation of the teeth, cases having been brought to his attention where it had effectually done this for fifteen years, in localities not subjected to the attrition of mastication. The object of these gold caps was to overcome this liability to wear in the material. The plates were of pure gold (made from scraps of gold-foil), which was milled down to number 29 of the standard gauge. Dr. Essig laid no claim to originality in this matter, according the idea entirely to Dr. Bing. The only point of difference in what he now proposed was the attempt at restoration of contour, which Dr. Bing did not resort to, so far as he was informed. For the better understanding of the two methods Dr. Essig illustrated both plans on the blackboard. Dr. Bing's plan was, to dress down the crown of the tooth ; the entire cavity of decay was now filled with Hill's stopping, and a pure gold plate, to which two loops of gold or platina wire were soldered (thus ❩ ❩), was warmed, and while warm pressed into the gutta-percha already inserted into the tooth, after the cooling of which the edges of the gold could be neatly burnished down to the edges of the tooth. By this plan *only simple crown cavities* were attempted. Dr. Bing kept on hand, ready made for these cases, these plates of different sizes, and applied them in size to suit each case. Dr. Essig had acted on the suggestion, but proposed to extend the field of its usefulness in cases where proximate, buccal, or palatal walls were consumed by decay.

He proposed to restore the tooth in shape as well as usefulness as follows: Cutting down the tooth wherever a comparatively firm border could be obtained, he restored the contour in wax, and, by having the patient close the jaws, obtained from the antagonizing teeth a complete and proper occlusion. By this plan teeth in almost any stage of decay might be made serviceable for a considerable time. The idea will be better understood by the following diagrams:

a.

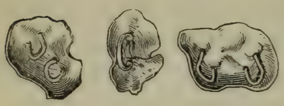


b.



The case illustrated *a* was now restored in wax as in *b*; when, as stated, an impression in plaster would be taken, plaster model made, and die and counter die obtained; a gold cap could now be swaged and loops soldered to it as represented in *c*. The body of this gold cap is filled with softened Hill's stopping as well as the remains of the tooth. The cap is placed in position and with a heated instrument the temperature conveyed through the gold cap to the gutta-percha in both the tooth and cap. The jaws may now be closed while the gutta-percha is soft, and when cooled off the excess of Hill's stopping removed and the edges of the gold burnished down to the tooth. To a cursory glance the whole operation presents the appearance of an artistically executed contour gold filling. These dies and plates may all be made by assistants in the laboratory, and the entire operation may not call for more than fifteen to thirty minutes of the operator's time. Dr. Essig gave the preference to Hill's stopping over oxychloride of zinc in these frail teeth, as he said he had found that when large masses of this were used it had sufficient expansive force to sometimes break a weak wall of enamel.

c.



Dr. Buckingham proposed or suggested the employment of 18-carat gold plate for these caps, as from its superior rigidity it would probably better serve the wear of mastication than the lead-like softness of the pure gold.

Dr. Spencer Roberts stated that Dr. Hickman had mentioned to him a plan for rendering serviceable teeth of the kind spoken of by Dr. Essig. His plan was as follows: He took an old porcelain crown and ground it down so as to fit in the cavity of the decayed tooth. Having notched this on its under surface the cavity of decay was filled with Hill's stopping, the porcelain warmed and pressed into place. The corundum points and wheels of the dental engine enable you to obtain a correct occlusion with the antagonizing teeth, and this hard triturating surface prevented the wear to which the material was subjected if not protected by some resisting substance.

SOUTHERN DENTAL ASSOCIATION.

In accordance with a resolution passed at the last annual meeting of the Southern Dental Association, held at Montgomery, Alabama, requesting the presiding officer to call a special session, I hereby notify all members of the above-mentioned society that there will be a special session held at Deer Park, Maryland, commencing Tuesday, August 14th, 1877, for the purpose of participating in a joint meeting of the American Dental Convention, and the Maryland and District of Columbia Dental Association.

Drs. R. Finley Hunt, of Washington, R. B. Winder, of Baltimore, and J. R. Walker, of New Orleans, having been appointed a committee of arrangements for this special session, it is to be hoped that they will leave nothing undone that will add to the interest of the meeting.

E. S. Chisholm, *Recording Secretary.*

S. J. Cobb, *President.*

MASSACHUSETTS DENTAL SOCIETY.

The semi-annual meeting of the Massachusetts Dental Society for 1877 will be held at the rooms of the Essex Institute, Salem, on Thursday and Friday, June 7th and 8th; commencing on Thursday, at eleven o'clock.

J. H. Bachelder, *Chairman Executive Committee.*

TENNESSEE DENTAL ASSOCIATION.

The Tennessee Dental Association will meet at Lookout Mountain, near Chattanooga, on Wednesday morning, June 27th, at ten o'clock. Reduced hotel and railroad rates have been secured.

L. G. Noel, *Secretary.*

OBITUARY.

DR. CHARLES A. JOURDAN.

Dr. Jourdan died from the 'effects of chloroform, which was administered to him for the purpose of enucleating an eye, which had been injured some five months previously. He was placed upon the operating table, and chloroform administered in the usual manner. The operation was speedily performed, but respiration and circulation ceased simultaneously, and all efforts to resuscitate were unavailing. He was forty-seven years of age, stout and hearty, and the post-mortem discovered no organic disease.

Dr. Jourdan was born in East Tennessee, and practiced dentistry for many years in Athens, Tennessee; subsequently in Huntsville, Alabama, and twelve months ago removed to Terrell, Texas, at which place he practiced until he received the accident referred to.

Dr. Jourdan was a gentleman, a first-class operator, a true and noble friend. His family have sustained an irreparable bereavement, and the profession has lost a worthy member.

S. P. Cutler.

DR. ELIJAH HUNTINGTON.

Died, April 7th, 1877, at West Randolph, Vermont, Dr. Elijah Huntington, in the thirty-eighth year of his age.

Dr. Huntington was a graduate of the Philadelphia Dental College. One who knew him well, and who had been associated with him, writes to us in terms expressive of very high regard for Dr. Huntington, of his professional ability and his social qualities.

BIBLIOGRAPHICAL.

The Transfusion of Blood and its Practical Application. By Thomas S. Morton, M.D. New York: G. P. Putnam's Sons.

This is a pamphlet of thirty-five pages, which constitutes the first number of vol. iii. of Seguin's Series of American Clinical Lectures. It is a condensed account of the history of transfusion and of the indications for its performance, with a description of the operation, as practiced by the author and by others. Dr. Morton's practical experience has been sufficient to enable him to speak with some authority as to the details of the operation, and of the various modes of performing it.

Johnson's New Universal Cyclopædia. Vol. III. New York: A. J. Johnson & Son.

The third volume of this grand compend is before us, including, in alphabetical order, the topics indicated from L to R inclusive. The general completeness, excellence, and usefulness which characterized the previous volumes are fully sustained; the same able and exhaustive condensation, the same careful and thorough scholarship, are apparent. The various scientific subjects presented are treated in such a manner that the average reader can possess himself of the leading facts and principles involved.

If the fourth volume shall, as it doubtless will, be kept up to the standard of those already published, we can have no hesitation in saying that Johnson's Cyclopædia will supply to the student a map of information such as was never before condensed in any similar publication. The work is sold only by subscription, in four styles, from $10.75 per volume upward, according to the binding.

Mothers and Daughters. Practical Studies for the Conservation of the Health of Girls. By Tullio Suyzara Verdi, A.M., M.D. New York: J. B. Ford & Co., 1877.

We regard this as one of the best books of its kind,—a plain but delicate presentation of facts with which every mother and every daughter of suitable age should make themselves familiar. The physiology of woman and her hygienic needs; the consequences of inattention to natural laws: fashion, dress, diet, amusement, etc., are discussed in a sensible and practical manner.

PERISCOPE.

Death from Nitrous Oxide Gas.—The lamentable death of a member of our profession from nitrous oxide gas is an event which deserves more than a passing notice. The facts, as given in our columns of last week, are painfully few and simple. On the 27th ultimo, Mr. G. Morley Harrison, a surgeon of thirty years' standing in Manchester, having been suffering from toothache for a day or two, applied to a neighboring dentist to have the tooth removed. It would appear that, from the pain and loss of sleep which he had undergone, Mr. Harrison was much unnerved and exhausted, and, feeling unequal to any further suffering, he insisted that he should be brought under the full influence of nitrous oxide gas. The newspaper report states that the dentist's evidence was that his patient asked to have the gas given to him "until he snored." This, apparently, was done, and two teeth were forthwith removed; but after the operation the patient remained unconscious. The dentist, becoming alarmed, sent for medical assistance, but, when a neighboring surgeon arrived, Mr. Harrison was dead. On post-mortem examination, some amount of fat was found about the heart, the cavities on the right side were distended with blood, while those on the left were empty. The lungs on both sides were gorged with dark blood. All the other organs were healthy. The jury returned a verdict to the effect that the deceased died from syncope during the administration of nitrous oxide gas whilst laboring under fatty degeneration of the heart. Such are the main particulars which are to be gathered from the reports in the local papers. It is, however, to be hoped, for the sake of science and of suffering humanity, that further details of the symptoms and post-mortem appearances will be furnished to the medical journals. One or two deaths have occurred from the administration of the anæsthetic in question, but in those cases death was probably due to accidents or complications. In the case before us, death seems to have been caused by an overdose of the anæsthetic, and to have resulted rather from asphyxia than from syncope. There is a little confusion between the statement of the medical witness and the wording of the verdict as regards the condition of the heart. There is a great difference between "some amount of fat about the heart" and "fatty degeneration," the former by no means necessarily implying the latter. It is very desirable that an exact account should be given of the state of the heart, lungs, and brain.

With regard to the incident itself—death from nitrous oxide gas—there are several points which deserve notice. This gas is administered daily by scores of dentists without the least apprehension as to any possible dangerous results, and it is not too much to say that the majority of these gentlemen are utterly ignorant of the physiological action of the gas, of the significance of peculiar symptoms in any given case, and of the measures to be adopted when those symptoms arise. Boldness results from ignorance. In Mr. Harrison's case the dentist might urge that, inasmuch as his patient was a surgeon, he himself was in great measure relieved of any responsibility with regard to the administration of the anæsthetic. This plea, however, will not hold good; the operator, whether he merely extracts a tooth or performs the most serious operation in surgery, is responsible for every detail connected with the operation. It is certainly he who must decide as to the assistance he requires. This is a responsibility which he cannot share with the patient, whoever the latter may be. The administration of an anæsthetic ought always to be intrusted to a competent assistant. He has his duty to perform while the operator does his work. It is, we know, common enough in small operations for the same man to administer an anæsthetic and then to operate; but the practice is mischievous and dangerous, and nothing but the utter impossibility of obtaining assistance, and the urgent character of the case, could justify such a procedure. Those who have seen dangerous symptoms during the use of anæsthetics know full well that it would be almost impossible for one pair of hands to take upon themselves the extra and responsible duty of combating the approach of death. When a man both operates and administers an anæsthetic his attention becomes divided. Should threatening symptoms arise when the operation is well-nigh over, he would be tempted to go on for a few seconds until he could lay down the knife or forceps. It might then be too late to avert a fatal issue.

We feel very strongly on this matter, and we maintain that no dentist is justified in administering nitrous oxide gas without the presence of a surgeon, and without being furnished with all necessary restoratives. We further maintain that no anæsthetic whatever ought to be administered to any person without a proper medical examination beforehand. It is a question whether anæsthetics ought to be so often resorted to as they are to save people the transient, though certainly acute, pain which accompanies the extraction of a tooth. Be this as it may, the sad catastrophe which has lately occurred at Manchester will not be without its uses if it draws attention to the dangers attendant upon the use of anæsthetics, and the precautions which are imperatively necessary.

Mr. Clover, in a letter to the *British Medical Journal*, expresses the opinion that death was due to syncope caused by the shock of the operation. He apparently wishes to attribute the fatal result to anything rather than to the gas. The facts of the case, however, and the post-mortem appearances in particular, not only fail to support Mr. Clover's view, but are decidedly opposed to it.—*Medical Examiner.*

Very few fatal accidents have hitherto attended the use of nitrous oxide as an anæsthetic; hence it has come to be looked upon as free from danger. For minor operations it is administered every day, and often by persons who would shrink from the responsibility of giving chloroform. Dental practitioners especially use nitrous oxide very largely. A catastrophe such as has just taken place at Manchester serves to remind us that nitrous oxide can no more be said to be absolutely free from risk than any other anæsthetic with which we are acquainted. No opportunity, then, should be neglected of ascertaining the mode of action of nitrous oxide, when it destroys life. In the only other fatal case which, so far as I know, has been recorded in England—I refer to the Exeter case—no inspection of the body was made. It becomes doubly important, therefore, that any fresh case should be reported with the utmost accuracy.

Now, judging from the facts of the case stated above, and especially from the condition of the thoracic viscera found after death, it cannot, I think, be doubted that the jury were mistaken in their verdict, and that the case was one of death from asphyxia, not from syncope.

The question is of the highest scientific and practical importance. It is most undesirable that nitrous oxide should be credited with a paralyzing influence over the heart, if it possesses no such influence. While again, looking at it from a practical point of view, we want to know in what direction we are to be on the lookout for the first signs of approaching danger, and it will not do for our attention to be concentrated on the condition of the pulse and the circulation, if the real danger is from suffocation. It is stated that, in order to shield the dentist from blame, the medical witnesses somewhat encouraged the opinion which the jury embodied in their verdict. This, however, I should be sorry to believe. I prefer to think that the jury, with the want of intelligence which is popularly ascribed to coroners' juries, misunderstood the drift of the medical evidence, and returned their misleading verdict in spite of it.—*Manchester correspondence of the Medical Times and Gazette.*

Want of space will prevent us making more than a few remarks on the recent death of Dr. Morley Harrison while under the administration of this gas. It has been the subject of very general comment in the newspapers, and the very rarity of such an accident has been the means of attracting particular attention to it. We need, however, scarcely remind our readers, who are acquainted with the physiological conditions involved in the production of anæsthesia by this gas, that it is an operation by no means free from danger. Notwithstanding the great success and safety which have hitherto attended the use of the gas in practical dentistry, there are circumstances under which such an accident may occur again. With a little care it may always be given without the least risk; but if it is carelessly administered to a person, the action of whose heart is very weak, or also is supposed to be laboring under fatty degeneration, or if its inhalation is carried to an extreme point, serious or even fatal results are not at all unlikely. In the Lumleian Lectures before the Royal College of Physicians, Dr. Johnson called attention to an element of danger which was possibly attached to the use of this gas. Considering the great tension of the left cavities of the heart at the commencement, and the engorgement of the right side towards the end of the operation, its administration would be attended with some risk in the event of the heart being diseased. It follows, therefore, that this gas should always be given either by a medical man or by a qualified surgeon-dentist, that the heart should be carefully examined previous to the inhalation, and that the inhalation should be stopped directly stertorous breathing or any other dangerous symptom makes its appearance.—*Medical Press and Circular.*

In the *Times* of Good-Friday last there appeared a notice, taken from the *Manchester Examiner*, of a death under nitrous oxide gas. The following was the verdict of the coroner's jury: "Died from syncope, during the administration of nitrous oxide gas for the extraction of teeth, while laboring under fatty degeneration of the heart."

The details of so unusual an event would be highly interesting to the medical profession, to enable them to judge of the safety or danger of the anæsthetic. To form a correct opinion, we should at least know how long the inhaler was applied, the order and manner in which the movements of the heart and respiration became affected, and what had been swallowed previously.

The verdict was probably inaccurate in stating that the syncope occurred *during the administration* of the gas, as no symptoms of danger were noticed until after the extraction of the second tooth.

The most probable explanation of this sad case is that the extractions were difficult, and that the patient, on recovering from the effect of the gas, was susceptible to the shock of a severe operation; and that this shock, and not the gas, was the cause of the syncope, which structural disease of the heart rendered fatal. Unfortunately, it appears that no third person was present, and we cannot expect the necessary evidence from the operator, whose attention was otherwise directed.

Those whose opinions of the effects of nitrous oxide are formed by inferences from Reid's "Experiments on Asphyxia," and some cases of cardiac distress, first complained of after inhaling gas, will blame the latter. Those who daily witness the continuance of the circulation, in spite of the blood being black from the gas, and the speedy and cheerful recovery from it, will conclude that so unusual a result must have depended upon the peculiarity of the patient, whose heart was found in a state sufficiently diseased to account for sudden death. —*J. T. Clover, in British Medical Journal.*

Death under the Administration of Nitrous Oxide and Ether. —A death has recently taken place at University College Hospital during anæsthesia from nitrous oxide gas and ether, being, we believe, the first fatal case which has occurred in this country that can be attributed to this combination of anæsthetics. The patient was a woman fifty-five years of age, who was admitted to the hospital in consequence of strangulated femoral hernia. When admitted she was in a very weak and exhausted condition from constant vomiting, the hernia having been strangulated for over forty-eight hours. She was taken into the operating theater, and gas and ether administered by means of Clover's apparatus. In about four minutes she was well under the influence of the anæsthetic, without having exhibited any previous excitement. Taxis was then applied, when almost immediately the patient became pale and recommenced vomiting stercoraceous matter. At the same time the respirations became weak, and the pulse at the wrist imperceptible. The doors and windows of the theater were at once thrown open, and artificial respiration was carried on for a few minutes. As no obvious benefit resulted, an enema, containing three ounces of brandy, was administered. Fumes of strong ammonia were applied to the nostrils, and ammonia injected into the right median basilic vein, but all without any good result, and the patient died within about ten minutes from the onset of the alarming symptoms. At the autopsy, stercoraceous matter was found in the trachea and right bronchus. The right side of the heart and the large veins were full of dark fluid blood. The ventricular walls were thin and flabby, and the cavities slightly dilated. The left ventricle was empty. The arch of the aorta presented numerous patches of atheroma.—*Medical Times and Gazette.*

Teething and its Complications.—The president read a paper on this subject. He pointed out the great importance of the subject to those practicing any branch of medicine, alluding to the extensive sympathetic connections of the nerves supplying the teeth with the system generally. He then spoke of the effect that the "habits of the age" exercise on healthy dentition; mothers being careless of their responsibilities, not only after but before the birth of their offspring. He next considered the difficulties of the first dentition, and the constitutional affections synchronous with that period—cerebral, cerebro-spinal, cutaneous, and other diseases—treating them in their two relations of dependence on, and independence of, eruptive complications. After giving the results of his experience in hospital and private practice, he remarked that he did not believe in the somewhat indiscriminate crusade against lancing, and quoted many instances of its proved efficacy when resorted to on rational principles. Finally, he considered the second dentition, pointing out how nearly every organ of the body might be more or less affected sympathetically by dental lesion; and concluded with several illustrative cases, and a *résumé* of those points which he considered to be especially worthy of discussion.

Mr. T. Edgelow was pleased that Mr. Cartwright did not condemn the practice of lancing. He alluded to several sympathetic disorders connected with dentition, and said that many of these might be relieved by the judicious use of the lancet.

Mr. Gaine (Bath) mentioned a case in which he was interested; and that, in his experience, lancing was often resorted to very indiscriminately. He was much opposed to the performance of the operation on expectant principles.

Mr. Napier was inclined to attribute a large proportion of cases of infantile convulsions to too rapid or retarded development of the teeth. Half a century ago, infantile convulsions were ascribed almost unconditionally to teething; now, some were inclined to almost entirely ignore its influence on the brain; but the relief sometimes afforded by the lancet, when applied at the right time and with judgment, was sufficient proof that there are cases in which the child suffered from a mere mechanical obstruction. The subject of dentition was one opening a wide field of interest to the physiologist. He called attention to the fact that the teeth must have a more delicate and complex organization than those structures whose constituent parts are less compact, and were, therefore, more liable to get out of order.

Dr. Little regarded the evils of dentition as the product of unfavorable influence, either before or at birth, or about the teething period. Infants born with an excess of vitality, from want of breast-milk, pure air, etc., become the subjects of "difficult dentition," rickets, infantile paralysis, bowel and brain diseases. He thought that the accumulated hindrances to development, during the early months of life, produced effects during dentition which were often attributed to it, instead of to disorder of more important organs, consequent upon errors of management or hereditary influence. At the same time, he agreed that difficult dentition reacted mischievously upon the sensitive nervous structures of the infant. He thought that the benefits due to lancing of the gum were due to the relief of pain and tension, and to its counter-irritant effect; and he asked for information as to the nature of the force which propels the tooth through the gum. He regarded it as the result of progressive addition of material to the body and the fang.

Mr. Cattlin agreed with Dr. Little that errors in diet and constitutional weakness might and did add to the danger of teething; but he had no doubt that convulsions and other serious nervous lesions often arose solely from irritation connected with teething. Infants in country districts suffered less than those living in large towns, showing that the weakly and scrofulous were more predisposed, and that the use of the lancet ought to depend upon a correct diagnosis, and should never be resorted to empirically. He quoted several cases proving its efficacy.

Mr. Hamilton Cartwright said that instances of sympathetic lesion connected with the teeth were innumerable. The occurrence of otalgia and otorrhœa, during the eruptive stage of dentition, was particularly interesting. Mere pain was explicable by the connection of the fifth with the auriculo-temporal and Vidian nerves; but the occurrence of suppuration was still more important, probably having its origin in long-continued irritation of Jacobson's plexus, which, supplying the tympanic structures, is in connection with the otic and Meckel's ganglia, as also with the facial nerve and the carotid branch of the sympathetic. He then alluded to the frequent occurrence of skin-diseases during dentition, and mentioned a case of neuralgia connected with the fifth nerve, which was always preceded by a rash. In considering the pathology of cutaneous diseases occurring at this period, the development of the teeth from dermal structures, as well as their nervous connections, should be remembered, as probably a more than chance connection existed between the nerves, skin, and teeth in such lesions.

Dr. Little mentioned a case in which a lady was attacked, whilst cutting her wisdom-teeth, by a severe impetiginous eruption, covering her head, ears, and face. Her mother said that she suffered from crusta lactea when cutting her first teeth.

Dr. R. Lee was inclined to ascribe most of the constitutional derangements occurring during dentition to a primary constitutional cause; as, for instance, the various forms of cutaneous eruption, diarrhœa, and such like. Though some of the disturbances in the nervous system of the young child were to be ascribed to the local irritation of teething, still it must be allowed that a constitutional condition might favor such irritation.

Mr. Risdon thought that the importance of the eruptive period in the child could not be overrated; and although he would not say that all ills connected with that epoch were owing to dentition, he thought that very many were.

Dr. West said the subject now discussed would show how closely dental surgery, practiced by those qualified to practice it rationally, was allied to general medicine; and how necessary it was that the practitioner should distinguish between those diseases which were dependent upon, and those which were distinct from, dental irritation. He mentioned the great predominance of the spinal over the cerebral system in early infancy, and showed how any eccentric source of irritation was thus liable to be the origin of serious mischief. He himself believed that to dentition directly might be ascribed many diseases, especially those connected with the nervous centers. Lancing had been mentioned as a method of treatment, and he thought that no one who had seen its results could doubt its great efficacy. He concluded by calling attention to the many interesting questions that Mr. Cartwright's suggestive paper had called forth.

The president briefly replied.—*Report of Association of Surgeons practicing Dental Surgery, in British Medical Journal.*

Swelling of Upper Jaw containing a Temporary Tooth.—Mr. T. Edgelow described a case of maxillary disease presenting remarkable, if not unique, features which had recently come under his care. A circumscribed swelling occurred in connection with the right maxillary bone; it was situated on its outer side, and was connected with a sinus opening by the side of the second bicuspid tooth. This fistula was about an inch in depth, healthy pus escaping from it on pressure. At its extremity a hard substance could be distinctly felt. The patient was sixteen years of age; and, all the permanent teeth being present with the exception of the wisdom-tooth, it was supposed to be an impacted supernumerary tooth; but, on cutting down upon it, it proved to be the second temporary molar, which not only showed that it had been decayed, but was actually stopped with an amalgam filling, proving that it had not only descended with the other temporary teeth, but that it had subsequently been driven beyond the range of the permanent teeth, giving no more trouble beyond the disfigurement occasioned by the tumor and a slight discharge which had lasted five years. Mr. Salter said that, in the only case of cyst yet recorded (by himself), in which a temporary tooth was the dental element concerned, the tooth was also a second upper molar. However, Mr. Edgelow's case was not really a cyst of this character. He considered that the tooth, having once been in normal position, had receded or been forced into the locality it afterwards occupied. The apparent cyst might have been the sac of an alveolar abscess, associated with this tooth. He had seen a condition repeatedly in which the second temporary molar tooth was pushed back into the substance of the jaw by the convergence and continued approximation of the crowns of the first bicuspid and first permanent molar. He had never seen the like effect produced upon any other temporary tooth than the second molar. The president asked whether a bicuspid tooth had not been unnecessarily sacrificed in the operation. He thought that the tooth could have been removed without the extraction of the sound tooth. Mr. Coleman thought Mr. Edgelow's case could be best explained by regarding the second temporary molar as placed in a double inclined place, viz., between the advancing crowns of the first bicuspid and first molar, which in their progress pressed or squeezed it up into the alveolus, as teeth were sometimes so pressed up under very undue pressure. Mr. Hamilton Cartwright said that, if Mr. Edgelow were correct in his assumption that this temporary tooth was encapsuled with an osteous envelope, he thought that this case might be explained by the process of maxillary development. On the eruption of the second teeth, absorption would take place, and this tooth would have been wedged up by the action of descending second bicuspid and first molars. Eruption being completed, deposition of bone would be so active that it might have incased this foreign body like a sequestrum in necrosis; the process ceasing, the tooth looked like an irritant, and set up reabsorption, chronic mischief, and discharge.—*Proceedings of Association of Surgeons practicing Dental Surgery, in British Medical Journal.*

CARIES OF THE UPPER JAW.—Mr. H. Cartwright showed a patient, the subject of caries of the right superior maxillary bone. The patient came to him with a tumor of the periosteum covering a large portion of the palate, this being in connection with two sinuses, one of which was at least an inch in depth, running parallel with the floor of the nares. On laying these open, he found the bone extensively diseased; and on removing it with a gouge, he came upon the apex of a bicuspid root not much larger than a hempseed, whence the mischief had evidently primarily proceeded. The wound was now healing from the bottom, and all discharge had ceased.—*Proceedings of Association of Surgeons practicing Dental Surgery, in British Medical Journal.*

HYPERTROPHY OF THE INTERMAXILLARY BONE.—Mr. Nathaniel Stevenson exhibited some plaster casts, showing the result of his treatment of a case of hypertrophy of the intermaxillary bone. The patient, being a lady of much personal attraction, was anxious to have the deformity removed; the protrusion of the tumor prevented her lips from completely closing, whilst the absence of the lateral, and the wide separation of the central incisors, and a mass of indurated gum exuding between them and imbedding the canines on each side, added much to the unsightliness of the defect. As no mechanical contrivance could be of avail without operative interference, the incisors were extracted; and, the hard spongy gum being removed and the soft tissues dissected away, the hypertrophied bone was excised under the influence of nitrous oxide gas and ether. The wound soon healed, and he then supplied the vacancy by a suction-plate in the way shown in the accompanying model. The president congratulated Mr. Stevenson upon the success of his treatment, the adoption of which was generally approved of by other speakers.—*Proceedings of Association of Surgeons practicing Dental Surgery, in British Medical Journal.*

LOSS OF TEMPORARY TEETH FROM ABUSE OF THE FEEDING-BOTTLE.—*Sir*,—Dr. Prall, in the *Journal* of 14th October, condemns what may be called the "constant supply" system of feeding infants, and it would be strange were so great a departure from the periodic feeding at the breast altogether harmless. When prolonged, as it generally is, after the upper front temporary teeth are in place, it indirectly causes decay, and not seldom the complete destruction of their crowns. Opportunities of observation enable me to affirm that instances of the complete loss of the crowns of these teeth have greatly increased since artificial feeding has lost its terrors, and the use of the long tube in improved feeding-bottles has become so very general. The food put into the bottle at night cannot fail to have an acid reaction long before morning, and, being rubbed on the backs of the teeth by the teat while sucking, it dissolves them more or less completely, as nursing is more or less protracted. Were infants fed at intervals, as at the breast, with fresh food, the bottles and teats being thoroughly cleaned immediately after feeding, the teeth would remain sound. The few cases of complete loss of the crowns of the upper front temporary teeth that formerly came under my notice were caused by the quieting expedient of a teat, without a bottle, soaked in sweetened milk, and sucked almost continuously, often a year or two after infancy; and this expedient comes now into use when the infant, having emptied its bottle, continues to suck as before. Parents are alarmed lest the early loss of these teeth indicates some constitutional delicacy, or may affect their replacement by their permanent successors. On both points they may be assured there is no reason for alarm, and, besides that, the temporary roots need not be interfered with.—*A. Stewart, F.R.C.S. Ed., in British Medical Journal.*

TREATMENT OF THE GINGIVITIS OF PUERPERAL WOMEN.—Drs. A. and D. Pinard (*Bulletin Général de Thérapeutique*, 1877, p. 157) call attention to this complication of pregnancy, which they assert to be of more frequent occurrence than is generally admitted. The appearances presented in mild cases are as follows. The gums in the neighborhood of the two maxillæ are redder and more congested than in the normal condition; they are tumefied, the interdental free border is exaggerated as to its normal festooned appearance, and covers, in part, each tooth. This condition is more marked about the convex portion of the maxillæ than in the neighborhood of the molars. The least pressure on the tumefied portions provokes hemorrhage. At a stage one degree further advanced, the teeth lose their solidity, can be moved laterally, and sometimes seem to yield to perpendicular pressure; sometimes they are pushed out of their sockets. Mastication under these conditions is, of course, more or less painful, and loss of blood occurs to a greater or less degree. Pain is rarely severe.

The remote cause of this affection is, of course, pregnancy; what the proximate cause may be, however, has not yet been demonstrated with certainty. It usually appears towards the fourth month of pregnancy, sometimes, but rarely, sooner, going away again a month or two subsequent to delivery, especially in women who do not suckle their infants. As to treatment, the authors have used solution of iodine, of glycerole of tannin, and chlorate of potassium, which, though producing good effects, are far from bringing about a rapid cure.

Chromic acid is useful in certain cases, but must be employed with great circumspection.

The following solution of chloral has given good results:

℞.—Chloral hydrat.,
Tinct. cochleariæ, āā q. s. M.

Of course the teeth must be thoroughly cleansed of tartar, etc., before this application is made.—*Phila. Medical Times.*

SYMPATHETIC EAR-SYMPTOMS.—Dr. E. Woakes read a paper on this subject. The conditions discussed in this paper were based on the frequently observed occurrence of inflammation of the ear and otalgia caused by the presence of a decayed tooth, or a sore on the tongue, and the equally common event of spasmodic cough induced by the presence of a foreign body in the meatus. The continuity of sensitive nerve-fibers being deemed insufficient explanation of these symptoms, the object of the paper was to supply the true method whereby through nerve-influence a genuine inflammatory action is set up in the ear, the original seat of irritation being widely separated from it. Great stress was laid on the importance of the fact that fibrillæ belonging to the vaso-motor system of nerves are mingled in the same fasciculus with those of the cerebro-spinal system; the former set of fibrillæ being brought into reflex relationship with the nervi vasorum distributed on the arteries of the part reflexly affected, by means of the sympathetic ganglia in which the two sets of fibers communicate. In this way it was shown that distinct channels of communication existed between the vessel nerves which regulate the supply of blood to the ear, and the otic ganglion, while branches of the fifth nerve connected with the carious tooth and the ulcers on the tongue also communicate with this ganglion. It was then indicated how morbid impressions affecting the latter would influence the former, and thereby produce vascular distention of the drum-head and contiguous regions, producing a veritable hyperæmia of these parts, to the consequences of which the pain and inflammation were referred. A similar communication was also traced between the nervi vasorum of the vessels of the larynx and the auriculo-pneumogastric nerve supplying the meatus, through the medium of which connection a case of laryngitis from the presence of a bean in the external canal was traced. The paper concluded with the suggestion that, owing to the sympathy thus established, it was possible for spasmodic croup in children to be due to draughts of cold air falling upon the ear, and advantage was taken of this sympathetic association to suggest a simple method of treatment in such cases.—*Reports Medical Society of London, in British Medical Journal.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

What is best to remove stain on teeth, caused by using persulphate of iron? —S. M. W.

I am suffering from chemical abrasion of the upper central incisors and cuspids and the lower incisors. Dr. Taft, in his recent edition of "Operative Dentistry," says "it is not merely local, and may be removed by constitutional treatment." What course of treatment is indicated?—A. E. S.

Will some one write plain directions how to repair celluloid plates when broken, and how to replace teeth on such plates?—W. H. H.

Is elaterium employed in the treatment of periodontitis? If so, will some one be kind enough to inform me as to the dose, method of administration, etc.?—G. B.

I WOULD be glad to be informed of what is newest in the modes of setting pivot teeth.—J. A.

I HAVE a little patient under my care who is suffering from diarrhœa, evidently caused by the irritation of teething. What is the best course to pursue?—J. L.

Do nerve fibrillæ pass into the tubules of dentine?—J. M. T.

WHEREIN is the danger in acute inflammation of the tonsil glands, and what is the best treatment?—E. T.

WHAT is the difference between sarcoma and cancer?—E. G.

ANSWER TO DIX.—Ill success with the use of oxychloride will attend a majority of cases unless an intervening impermeable substance be interposed to shield the delicate pulp from the acrimony of the hydrochloric acid therein contained. The prevention of pain can be successfully attained by painting the pulp-surface, previous to the introduction of the oxychloride, with a solution of Hill's stopping in chloroform,—the cavity in the mean time to be kept perfectly dry. By properly observing this plan almost invariable immunity from pain will be secured, even when considerable exposure of the pulp exists. But in the latter case it is well to bathe the exposed surface before interposing the film of Hill's stopping with equal parts of chloroform and tincture of aconite, to which might be added a drop of creasote or carbolic acid.—A. F. MCLAIN, D.D.S.

REPLY TO DIX.—For the benefit of "Dix" I will describe my method of filling with os-artificiel, which is as follows: After having prepared my cavity, I adjust the rubber dam so as to exclude all moisture during the operation, as it is important to keep this substance dry until hard. I then wipe the cavity out with a pledget of cotton saturated with oil of cloves, which has a very soothing effect upon the sensitive dentine. Having accomplished this much, I prepare my oxychloride as follows: take of the oxides of zinc and tin equal parts, then moisten with the chloride, using only sufficient to make a thick paste,—about the consistence of putty,—and it is just at this point that I think "Dix" experienced all his trouble, viz.: mixing the oxide with an excess of the chloride and introducing it in this state, thereby drowning the nerve, so to speak, with a powerful escharotic, and hence the intolerable pain. The sooner the oxychloride is introduced after being mixed the better, as it weakens the filling to break up its particles after once having commenced to set. The advantage claimed for the admixture of the oxide of tin is that it renders the filling more dense and hard, thereby enabling it to resist the action of mastication for a longer period than the plain oxychloride. In cases of complete exposure, I have had considerable success to follow the application of some non-conducting substance, such as a thin section of cork, immediately over the exposure, and filling as before described.—F. T. D.

DIX will find little or no trouble from *pain* with the oxychloride if he will dilute the fluid with an equal volume of distilled water. But what is much *better*, I use the hydrated oxychloride of zinc, described on first page of DENTAL COSMOS for November, 1876.—W. B. S.

If "Dix" in capping exposed pulps will lay a substratum of white oxide of zinc mixed with creasote to the consistency of a thick paste, adapting it to the pulp and bottom of the cavity with a pledget of soft dry spunk before applying the oxychloride of zinc, he will avoid the infliction of pain to his patients of which he speaks.

Or, if instead of the creasote, to one drop of the chloride he adds one drop of water and mixes, applying as above, he will seldom inflict pain of long duration.

A thin layer is sufficient, and if allowed a few moments to harden, the further application of the usual mixture of oxychloride of zinc may be made with but little danger of trouble. Oxychloride cappings should be mixed as stiff as practicable, and as soon as adapted to the cavity an absorbent should be applied to take up any excess of the chloride, for to that the pain is attributable.—Rex, *Lincoln*, *Neb.*

If "Dix" will first apply carbolic acid to the exposed nerves and allow it to remain for five minutes, and then use the oxide or powdered preparation of zinc, combined with carbolic acid and worked into a paste, and apply as a nerve-capping, and not make use of the chloride or liquid which accompanies the packages for such purposes, I think he will find no more complaint about aching teeth after the application is made. This has been my plan of nerve-capping for four or five years past, and I have met with very few failures since I adopted it.—A. H. H., *Jackson*, *Miss.*

Reply to Dix.—For eight years I have had no such experience in the use of os-artificiel as you speak of, and I use it exclusively for capping exposed pulps. If the pulp has been aching over twenty-four hours, it is best to deplete if blood will flow freely. Apply carbolic acid, and, without wiping it out, apply a paste of os-artificiel of consistency of thick cream; with bibulous paper and suitable instrument, gently press accurately in contact with the pulp and absorb the chloride. Put any temporary filling over this. If pain should be experienced after two hours, deplete again and proceed as before. Generally permanent filling may be put in at once.—W. E. Driscoll.

Answer to Dix, in the April number of the Dental Cosmos.—Mix the powder first with carbolic acid and place over the pulp, press in lightly a piece of spunk or cotton to absorb the excess of acid, wait a few moments, and then apply the zinc, mixed in the usual way. I have used the above plan for four years, and can't recall an instance where I have had what you may call a violent toothache, and it is rare that there is any trouble at all. I capped four molars in one mouth not long since, and they did not give the slightest pain, and in two of them the pulps were entirely bare.—F. H. Lee, D.D.S., *New York.*

Answer to Dix, who cannot use oxychloride of zinc in live teeth without giving great pain.—Dry your cavity and apply oil of cloves on a pellet of cotton; then insert your filling in as dry a state as possible, and I think your difficulty will be obviated to a great extent.—B. D. Palmer, D.D.S.

Answer to Dix.—In mixing the oxychloride of zinc use only enough of the liquid to make it adhere so that it will powder in the hand. You may use this over exposed pulps almost without fear. Don't press hard when putting it in. Will do no harm to cover the nerve with a little rubber in solution before applying. The pain that follows will be slight.—H. B.

In reply to V. E. N., I would say *decidedly yes.* It is a well-known fact to every medical man that syphilis may be conveyed by only a kiss, and much more readily by dental or other instruments.—W. B. S.

C. O. B. inquires about periodic neuralgia in the temporal region. It is undoubtedly a case of malaria. If there is a decayed dens sapientiæ on that side, remove it, then give the following:

℞.—Quinia sulph., gr. xv;
Fl. ex. gelseminum,
Fl. ex. aconiti fol., āā ʒss;
Syr. simp., ʒvii. M.
S.—Dose fʒi, every two hours.

—W. B. S.

R. J. H. inquires about abscess from putrescent pulp. Syringe the cavity with tepid water, dry it, and fill with cotton dipped in saturated solution of salicylic acid in ether.—W. B. S.

J. M. H. desires to know how to prevent the dark lines in celluloid plates. I would say that they can be prevented by attention to the following instructions: *First*, select a blank plate somewhat thicker in central portion of arch than the wax or trial plate. *Second*, soften the blank that it may be conformed as nearly as practicable to the surface of the arch of model, remembering that the flowing of the celluloid should be from within outward. *Third*, if the gates in the mould are not amply large to receive the surplus the precaution must be taken to pare off some of the thicker portion of blank near the rim; for, should this step be overlooked, when the power is applied a flowing and overlapping of the material upon itself will result.—C. N. BOARDMAN, *Minneapolis*, *Minn.*

REPLY TO J. M. H.—Use mucilage in place of oil.—H. B.

ANSWER TO CREASOTE, who inquires as to the reason for saturating a cavity with creasote before introduction of the filling.

Two reasons carry much weight. If the *débris* that is removed from a carious tooth be examined under a microscope it will be found to be a habitation in which fungi most abundantly flourish. A cavity in which such fungi exist, even though it be filled by the best of the metal-workers, remains in a pathological state; the life of the tooth is being sapped by the parasites which continue to prey upon it; creasote destroys these spores; here is its first and most important use.

Second; creasote is a stimulant. When introduced into a cavity it acts upon the pulp just sufficiently to urge on a re-formative action; it conduces to a consolidation of the tubular structure just as we find such condition resultant of that slight irritation which attends the gradual wearing down of teeth.

As an antiputrescent, creasote plays a part more or less important. Teeth enveloped with an alkaline and offensive saliva necessarily benefit from the cleanliness arising from the use of so antiseptic a means. It is to be recommended, except where oxychloride of zinc is to be employed as a filling, that every cavity be first soaked with creasote before a plug is put in.—C. A.

ANSWER TO CREASOTE.—There can be no valid reason for *soaking* a carious cavity with creasote or carbolic acid previous to filling it. This practice has doubtless grown out of the fact that those who follow this habit may have, on some occasions, prevented pain and perhaps inflammation of pulps partially exposed by saturating the cavity with creasote previous to filling it. The explanation, when successful, is to be found in the affinity which creasote or carbolic acid has for the albumen of the tissues,—coagulating it into a protecting membrane, and thus saving the pulp from the irritation that would result from the presence of a filling. The better course when a necessity exists for a capping is to adopt the method I have recommended to "Dix."—A. F. McLain, D.D.S.

Reply to D. E. C. as to Celluloid.—I would state that I have been using the material for several years past, and have experienced no difficulty whatever about the camphor taste, and cannot see how it would be possible for a celluloid plate to produce salivation.

If he will allow his plates to season for five or six hours after removing them from the flask and "finishing up," he will find neither camphor odor nor taste about them. The filing, scraping, and polishing employed in finishing a plate bring a considerable amount of free camphor to the surface, which will readily evaporate if the work, when completed, is allowed to stand several hours before inserting it in the mouth.—A. H. Hilzheim, *Jackson*, *Miss.*

Reply to Alum.—Alumen, sulphate of alumina and potassa, like charcoal, would be one of the best of agents for the dentist's purposes were it not that there lies an evil in it which is found too often to overbalance the good to be secured.

A detergent and an astringent, its use would seem to be indicated in a great number of cases, but so corrosive of the enamel is it, that to employ it with any degree of freedom is to entail destruction on the dental organism. Before making the addition of alum to a dentifrice, as has been recommended, it will be well to observe the effects of the salt on a tooth which shall have been allowed to remain immersed for a few hours in a solution of it.

It is a matter worthy of more attention than has been given the subject whether the alum so freely used by bakers to whiten the bread made by them is not a source of great injury to the teeth.—P. M.

Reply to Nerves, who asks concerning nervous sedation.—A glass of ale at bedtime is a good composing draught to most people, and is among the most commonly-employed sedatives. A reliable preparation in the same direction is the salt known as the bromide of potassium, the dose of which varies from ten to forty grains, dissolved in a wine-glass of water; the writer generally prescribes twenty grains as a dose for an adult. Formula:

℞.—Potassæ bromidii, ℥ss;
Aquæ, ℥viii. M.

Sig.—Tablespoonful each four hours until quiet.

Another, and now most fashionable preparation, is the monobromide of camphor; the dose is ten grains. Still another is the camphorate of ammonia, a combination of camphoric acid and ammonia, admirably adapted to cases of debility.

From among the opiates proper, selection is to be made of the bimeconate of morphia, the strength of the solution to correspond with that of laudanum. Dose, twenty-five to fifty drops.

The use of morphia, subcutaneously, is an admirable and reliable means where excitability of the system is conjoined with irritability of the stomach. The dose is from one-fourth to one-half grain dissolved in about eight drops of water. Great care is to be exercised that the injection be not thrown into a vein.

It is to be hinted to "Nerves," however, that experienced practitioners are never over-hasty in the administration of medicines. Nervous people, if let alone, will commonly come to a self-sedation. A walk with a cheerful friend, or an hour at the church or in the theatre, according to disposition, are good resters. For ourselves, we affect greatly the warm or cold bath, according as experience has shown that the one or other of these agree best with the individual prescribed for. It is to be accepted that the person who has to resort to medicinal sedatives on every trifling occasion is on the down-hill track, and the sooner his adviser looks into the general requirements of such a case the better for the patient. We have put many such to sawing wood or to rowing up and down the Schuylkill in an out-rigger.—N. S.

Reply to R. J. H., in the April number of the Dental Cosmos, who makes the statement,—"A molar or bicuspid, abscessed from putrescent pulp, *without* fistulous opening, but with discharge through pulp-canal into the cavity of the tooth," and then asks, "What is the most approved method of treatment?"

The case cited is quite a common one, as the fistulous opening is very seldom made when the pus finds an easier mode of escape through the canal and pulp-cavity.

My mode of proceeding in such cases is first to ascertain whether the tooth is worth saving. Being satisfied in my mind as to that point, I proceed to remove the suppurating nerve or pus thoroughly from the pulp-cavity and canals of roots. Having accomplished this, next inject water freely into the tooth, then take a broach and wrap it around lightly with cotton, and having saturated it freely with carbolic acid, pass it repeatedly into the canals of the roots as far as possible, with an injecting motion. This serves to carry the carbolic acid up to and into the abscess at the apex of the fangs. The concluding part of the operation will be to saturate a small pellet of cotton in carbolic acid, and with a delicate instrument (a broach with the barbs removed is best) carry the cotton as far into the root as possible and leave it there, and fill up the pulp-cavity and crown of the tooth with cotton saturated with sandarac varnish, and allow the tooth to remain thus for twenty-four hours. Continue this treatment daily until all appearance of pus or soreness in the offending member is relieved.

It sometimes becomes necessary, where the nerve-canal is constricted, to enlarge it with one of White's nerve-cavity drills, which are long and delicate and reach well into the seat of trouble.

I have sometimes found in stubborn cases that aromatic sulphuric acid followed by iodine each succeeding day was a good substitute for the carbolic acid treatment. It is generally best to first use a temporary filling of oxychloride of zinc or Hill's stopping, so that in the event of any indication of returning soreness the filling could be easily removed and the treatment resumed.—A. H. H., *Jackson, Miss.*

Reply to J. L., who asks concerning a recipe for bad breath. To ask for a recipe, a single recipe, implies that J. L. looks at things in a very one-sided manner. Bad breath, *i.e.*, offensive breath, arises from a great variety of causes; a recipe to have any meaning of good in it must be based on a diagnosis which is to be carefully made, and which is to precede the prescription.

The causes of offensive breath are to be examined under the two heads of local and systemic. As the first are concerned we may enumerate carious teeth; accumulation and degeneration of the common antral secretion; degenerated pus from tooth-abscess discharging into the antrum; ulceration of mucous membrane of antrum; caries of the osseous walls of the antrum; ulceration of the mucous membrane of the nares; caries and necrosis of the nasal boundaries; foreign bodies impacted about the nares. As regards the second of the causes, the constitutional, the most marked illustration is exhibited by the alkaline diathesis. The syphilitic and scrofulous cachexia are other examples. In dyspepsia, a condition so frequently allied with fermentation of the food, the breath is occasionally found so sour as to make offensive the atmosphere of the room in which the affected person is sitting. J. L. is to look for the cause of offense in the case to which he alludes, and this being discovered he will have won half the battle towards a cure.

It is the case, however, that the use of antiseptics is found to be necessary while the rational treatment of a case is under way. We append certain formulæ which we employ most frequently in our own practice:

Formula 1. For local use.

℞.—Potassæ permang., gr. xx ;
Aquæ, ℥viii. M.

Formula 2. For local use.

℞.—Zinci chl., gr. viii ;
Aquæ, ℥viii. M.

Formula 3. For local use.

℞.—Tinct. arnicæ rad , ℥i :
Chloral hydrat., ʒss ;
Aquæ, ℥viii. M.

When offensiveness of breath is caused by an ill condition of the mucous secretions of the oral cavity the following combination, used after the manner of an ordinary tooth-wash, will afford great relief:

℞.—Tinct. opii camph.,
Tinct. pyrethri,
Spts. vini,
Tinct. gentianæ comp., āā ℥j ;
Tinct. quillai, ℥ij ;
Potass. permang., gr. xv ;
Tinct. capsici comp.,
Acid. sulph. aromat., āā ʒi.
M., et adde tinct. gaultheriæ q. s. for flavor.

While waiting for the correction of a systemic cause there is no better preparation to use than the aqua chlorinei (Watson's), dose 10 to 15 drops repeated *pro re nata*. This medicated water toned with some agreeable flavor makes a valuable prescription where a temporary disinfection is desired.—P. R. L.

Answer to G. A. R.—The query of this correspondent finds easy or difficult answer according to the articulation existing in the case he has under treatment. Where, in the case of the superior arch, the teeth shut well over those of the lower, so well over as to permit of a slight retraction without interfering with the scissor-blade relation, then all that is found necessary to be done is to extract the first bicuspidati ; this affords the necessary room, and the cuspidati fall into line without demanding further assistance. In the case of the same deformity existing in the lower jaw, like attention is demanded by the articulation. If the removal of the bicuspidati will not be found to interfere with a satisfactory occlusion, then these teeth are to be removed.

It happens, however, although the cases are infrequent, that an upper denture is found to be at what should be the minimum of a proper articulating measurement. In these cases it may be found that a contraction of the arch resulting from the proposed extraction can be antagonized by a removal of similar teeth—whether misplaced or not—from the lower. To extract from both jaws is, under such circumstances, a practice to be commended.

When the deformed arch is small and the indication is to make it larger, securing after such a manner room for the projected teeth, the method of proceeding is both complicated and varying. A plate devised by the late Dr. Westcott, of New York, and which will be found figured and described in Garretson's "System of Oral Surgery," page 483, answers an admirable purpose. In cases where but little space is demanded for the accommodation of the protruding cuspids such space may not infrequently be secured by means of an appliance (Fig. 213) shown in the same volume; the throwing outwardly of the bicuspidate affecting this room.

A manner commended by some practitioners consists in separating each individual tooth from its neighbor by means of a series of wedges. Such a manner of treatment may be employed alone by the experienced and judicious; the health of a mouth could most easily be destroyed by its employment.—L. M. X.

VERMILION AS A COLORING MATERIAL IN DENTAL BASES.—The question is often asked me, both personally and by letter, whether the vermilion entering as a coloring matter into the composition of red rubber and celluloid dental plates is deleterious to the general health of the wearer, and whether ptyalism may not be induced where an idiosyncrasy exists. I have received quite a number of letters on this subject, and find that a great many dentists believe in the poisonous effects of vermilion. In replying to these queries I have always given, as my humble opinion, that the abnormal condition of the tissues of the mouth, so often seen in cases where vulcanite is worn, is due, first, to the fact of their being constantly covered by a non-conducting substance, which cannot but exert a modifying tendency upon the mucous membrane; and, second, to want of cleanliness,—the secretions of the mouth, particles of food, etc., being exposed to an elevated temperature undergo fermentation, thus becoming irritants to the tissues.

I do not believe that any one ever experienced the physiological effects of mercury in consequence of the presence of vermilion in an artificial denture, nor that such effect would result even if it were possible for any of the compound to find its way from the plate into the stomach.

Vermilion, mercuric sulphide (HgS), is inert. Neither water, alcohol, the alkalies, nor the mineral acids singly, have any action upon it. To decompose vermilion and liberate metallic mercury a temperature of 600° F. is required, and only strong nitro-hydrochloric acid will convert it into an active or poisonous preparation of mercury, viz., corrosive sublimate, $HgCl_2$. As it is not at all likely to meet either with this temperature or with this agent in any part of the human economy, it therefore would seem impossible that active qualities could be developed from it by the ordinary use of an artificial denture, in which it enters as the coloring matter.

Where tin-foil is used as a coating for the plaster model, the operator should be careful to use a single acid, either nitric or hydrochloric, to remove this tin-foil from the vulcanite plate. It would be perfectly natural for the dentist to use nitro-hydrochloric acid for this purpose, knowing it to be the best solvent for tin, but he should bear in mind that it is the latter which alone has the power to convert this perfectly inert compound of mercury into one of the most active and terrible of corrosive poisons.—C. J. ESSIG.

DENTAL JURISPRUDENCE (Brown *vs.* Mead).—A case was recently tried in one of the lower courts of Boston which excited considerable interest in the dental profession. The facts, as brought out at the trial, were as follows: A certain Miss Brown went to the office of Dr. Mead, a dentist, to have some teeth filled. Nothing was said before the work was performed touching the price or when it was to be paid. There was a notice in a prominent position by the side of the operating-chair to the effect that the doctor's terms were cash, and no charges would be made to any one. The bill was fifty-one dollars, which Miss Brown declared to be outrageous. She expressed no dissatisfaction with the work itself, "did not come prepared to pay," and requested the doctor to take in payment an order for advertising to the amount of his bill. This the doctor declined, but finally agreed to take an order for advertising to the amount of twenty-five dollars and the balance (twenty-six dollars) in money. Miss Brown then said it would be necessary for her to go home to get the order and the money; but the doctor would not allow her to go without leaving some security. She said she had nothing; but Mead insisted that she had a watch, and should leave that. She refused, and attempted to leave, when Mead (as she states) locked the door. This Mead denied. On attempting to leave again the doctor pushed her back into her chair, and went to the window and called for a policeman. The officer came in, and matters were explained by Mead to him, and he told the lady she had better leave her watch as security. She demurred, but did so, and then went home.

Mead at once commenced a suit on his bill, and Miss Brown followed with an action of tort against him for imprisonment, etc., laying damages at three hundred dollars. The last-named action was first tried, was heard by a single judge, and Miss Brown prevailed. Damages, one hundred and fifty dollars and costs.

Considering himself aggrieved, Mead appealed to the Superior Court, where the matter is still pending. The other case of Mead *vs.* Brown, on the bill for services, has not been tried, and the doctor retains the watch.

The question arises, What rights has a dentist in such a case, and how can he act to protect his interests?

Unquestionably a person who, without means or credit, has work performed, and this with a plain notice in the room that the terms are cash only, renders him- or herself amenable to the law for obtaining goods under false pretenses. And it is equally clear that a dentist has no lien on the body of the patient for work performed. His only remedy is to proceed against the debtor criminally, and in this case the *onus probandi* would be upon the dentist to show bad faith on the part of the patient. It behooves the dental profession, therefore, when the patient is unknown, to imitate their legal brethren, and exact a "retainer" or earnest before commencing a work of any amount.—GEO. B. HASKELL.

A CASE OF FUSION.—A gentleman, seventy-two years of age, consulted me with reference to a constant pain in his left ear and inflammation of the left eye. He had but one tooth remaining in the left side of the upper jaw,—a second molar. I diagnosed exostosis and advised extraction. He consented, and, after considerable effort and coaxing, I succeeded in dislodging it, bringing with it the wisdom-tooth, which was very thoroughly fused at a right angle with it. It had remained imbedded in the alveolus, and had never given rise to any unpleasant consequences until a few months previous. In a very short time after the operation all pain and trouble in the eye and ear had disappeared. I inclose the specimen.—L. M. HALL, *Rome, Ga.*

[The specimen accompanying is one of the most decided and interesting cases of fusion which we have ever seen.—ED. DENTAL COSMOS.]

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to Act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 287.)

WHILE in many instances an arsenious application of a few hours' duration will so affect a pulp as to render its extirpation a painless operation, it will in many other instances be found impossible to extirpate, without the infliction of severe suffering, even after an application of two or three days' duration.

At any time, however, a deeper application will continue its progressive work, and this raises the question, Why should this deep-seated application do that which it could not accomplish from its external position?

It is fair to assert that the intervening dead tissue prevented its action upon the living portion.

How long would this act as a preventive?

Experiment proves that it will do so in many instances for so long a time as to render it doubtful as to whether the arsenic has much, if anything, to do with the final result,—that is, the devitalization of the *very last portion* of pulp-tissue,—or whether this eventual death of the entire pulp is due to any other than the natural influence of contiguous dead tissue.

But in the vast majority of cases it has been forced upon me to adopt the opinion that the devitalization of the pulps has been due *to a controlling arsenical impression;* for, though I have repeatedly proven by experiment that the amount of arsenic taken into any one pulp is almost incomprehensibly minute (never more than the one-millionth of a grain), it is nevertheless productive of death in a much shorter space of time than would be required by that degree of irritation which would be induced by the presence of dead matter alone.

Ordinary medicinal pulp-devitalization, therefore, is due to the *combined influence* of arsenical impression and the presence of dead tissue, killed, in first bulk, by direct arsenical irritation.

It is therefore desirable that the most arsenious acid possible should enter into the pulp-structure, be that *most* ever so little.

That this result may be obtained understandingly it becomes necessary to inquire:

1st. How is arsenious acid introduced into the pulp-tissue?

I answer, through the medium of the circulation.

2d. What is the effect of an arsenical application upon a pulp?

First. Acting as a dynamic, vital irritant, it causes a "determination of blood," occasioning the uneasiness and throbbing of which patients generally speak about fifteen or twenty minutes after the application has been made.

Second. Congestion; occasioning the cessation of throbbing, and the dull "growling" assertion of the presence of the tooth.

Third. Usually, complete cessation of pain, leaving like the going down of a wave; this condition has a very varied length of duration, dependent upon extent and frequency of previous pulp-irritation; extent of pulp-exposure; temperamental impressibility; systemic ability to resist and react; and such like considerations. And in strict relation with these we have either *one* such demonstration as has been given under these three stages, followed by the quiet and complete devitalization of the pulp, or, in aggregating degree of severity, two, three, four, or a dozen or more consecutive paroxysms of toothache, followed by intermissions of relief from suffering, each dependent upon individual peculiarities for a given amount of pain, a given frequency of repetition, and a given length of duration of intermission.

Thus, for example, the nervo-sanguine patient would be *liable* to have pain and paroxysms in excess, with limited duration of intermissions; while the bilio-lymphatic patient would be as *liable* to have a minimum of pain and frequency of paroxysms, and a maximum of length of intermissions.

After a certain lapse of time, from a few hours to a day, the action of arsenious acid, as given under these first three heads, eventuates in the *death* of that portion of the pulp *absolutely contiguous* and *in near proximity* to the medicament.

This result is due to the double action of the escharotic effect of the creasote or carbolic acid and the irritation of the arsenic.

It is at this point that it seems most desirable to discuss, very briefly, the value of the admixture of either creasote or carbolic acid in the formation of arsenical paste.

The original suggestion of moistening the pellet of cotton with creasote prior to touching it to the mixed powder of arsenic and morphia was made at least forty years ago, and has been continued in use ever since by many practitioners; but the erroneous statement that the arsenic is *soluble* in creasote and carbolic acid, has so universally been accepted by dental practitioners, that the *true reason* for which it was suggested has been completely lost to view.

This was its notable *pain-obtunding* power; it was added for the purpose of alleviating the suffering which was the frequent concomitant of the arsenical irritation.

It was added to the acetate of morphia as an increased guarantee that the least possible pain should accompany the most thorough possible poisoning; and it has now become questionable with me as to whether the *oil of cloves* may not *advantageously* be substituted in its place.

It is only during the past year that I have employed the following formula:

℞.—Ars. acid, gr. v;
Morph. acet., gr. x;
Ol. caryophylli, gtt. x. M.

and therefore a sufficient number of applications have not as yet been made for the deduction of any definite conclusions; but, so far, my results have been such as to compel the *advice* for experiment in this direction on the part of others, for *I do not think that I shall ever return* to the creasote or carbolic acid formula, which is, at present, generally accepted as "the best."

The object of the morphia is twofold, and is of about equal value in both directions.

It is with this salt that we gain that distention of the arsenic which *prevents its escharotic* effect, and thus insures the introduction of the greatest possible amount of this medicament into the structure of the pulp; while, at the same time, the simultaneous endosmosis of the morphia results in that paralysis of the nerve-filaments which markedly modifies the pain which might be coincident with this slow and continuous irritation.

Having gained, in the prevention of the escharotic action of the arsenic, it seemed probable that loss would be sustained by the presence in the application of any ingredient possessing this characteristic; creasote is a decided escharotic, as is also oily carbolic acid; while the oil of cloves, also a notable pain-obtunder, is very slightly, if at all, escharotic; and it is for these reasons that I now make my arsenical paste of this essential oil, *in which, however, the arsenic is quite as insoluble* as in either creasote or carbolic acid.

With this form of paste, then, we have as the *fourth* effect of the medication the *death* of that portion of the pulp absolutely contiguous and in near proximity to the application.

And now we must particularly take cognizance of the special anatomy relating to the organ we are treating, for another cause of irritation, purely mechanical, has by this time commenced taking a part more or less active, according to the development of the tooth and the temperament of the patient.

It must be remembered that the dental pulp is surrounded by unyielding walls; that the cavity in which it is located is comparatively quite large and bulbous in the center of the tooth; and that the apical foramen is almost always exceedingly minute before any exposure of the pulp is liable to occur as the result of caries.

With this reflection, it will be seen how promptly increased circulation would lead to strangulation, preventing, first, the egress, and, secondly, the ingress of blood, thereby stopping all functional action.

Congestion, we know, does this; and this gives us the solution of two results, viz., the absence of pain during the devitalization of the remainder of the *bulbous* portion of the pulp, and the cessation of further introduction of arsenious acid to the canal portions of the structure.

This latter deduction having been reached *theoretically*, it remained necessary that it be proven experimentally. I therefore, many years since, instituted a series of *gradual increase in duration of application*, until I had learned that I could safely permit the retention of the arsenic until *complete devitalization and sloughing* of the pulp had occurred.

After having demonstrated this, I commenced saving such pulps as had been extirpated *entire*, and *without pain*, and *ten* of these were tested for arsenious acid by Reinch's test, which possesses the *requisite*, in this case, of giving a close approximate to the amount of this substance present; a proof of its presence was obtained, which was *duplicated* in a solution containing one-hundred-thousandth of a grain of arsenious acid; thus giving, as the amount contained in the tissue of each pulp, the one-millionth of a grain.

Ten other pulps, extirpated painlessly and entire, were then taken for a second experiment, and tested with about the same result.

The ten cottons upon which these last applications were made gave nearly one-third of a grain of arsenious acid; thus showing that no *apparently adequate* amount of the arsenic had been taken up *in* the pulp-tissue by *absorption*, or *upon* it by *contact*.*

The results of these experiments I have taken as the explanation of one of the usual sequences of arsenical pulp-treatment, to wit,—the *subsequent putrefaction of the pulp-tissue.*

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* In the experiments for deciding amount probably *absorbed*, those minute portions of the pulps which had been in *contact* with the arsenic were cut off, that *adherent* arsenic might not influence result.

As I have stated under the head of "medicinal properties" of arsenic, this medicament "prevents putrefaction in the *entire tissue* of such animals *as are devitalized by it*, and tests for arsenious acid show its presence in *every organ and tissue.*"

These tests, in such cases, are not in mere *nominal* degree, but are amply sufficient to satisfy as to the cause of death; and the correctness of the conclusion is verified in the arsenical preservation of the devitalized structures.

In pulp-testing, we have, as has been shown, the presence of a "trace" of arsenic, enough to warrant the conclusion, *sustained as it is by the fact*, that the arsenical *impress* has had its decided influence upon, practically, the entire pulp; but that its action has *not been* that of the *only* devitalizing agency, as, if that were the case, the dead tissue *would not become putrescent.*

It is the almost universal experience, that after an arsenical application has remained in a tooth for several days soreness of the organ supervenes; a tenderness upon occlusion; slight pain from striking, etc.; all indications, apparently, of peridental difficulty; *but these same symptoms are concomitant with the dying of the last portion of pulp, no matter from what cause*, and, if a pulp be extirpated during the existence of this condition, it will, under the microscope, present an appearance which will clearly indicate the reason for such tenderness, in the evident absence of vitality in the greater portion of tissue, *and the equally evident presence of high inflammation in that portion immediately contiguous to the apical foramen.*

I have reason to believe that many teeth have been needlessly lost, and an immense amount of suffering needlessly inflicted, as the *combined result* of this *natural* apical irritation *and the prevailing belief in the teaching of apical arsenical poisoning.*

With full faith in this erroneous doctrine, it is not surprising that such marked tenderness as is frequently developed in from four or five days to a week after an arsenical application should be directly attributed to it; and it is equally natural that the attempt to stop further irritation should be made by promptly opening the pulp-cavity and removing the pulp, this being the accredited vehicle for the transmission of the poison.

With the view which I have presented of the *actual condition* of the pulp, and with the knowledge that the tenderness is *not due* to arsenical irritation, but is simply that hyper-sensation which is concomitant with the effort to establish that approximate to normality which alone can be possible after pulp-devitalization, and which is intended to result in that modification of varied functions which permits alike the absence of the dead pulp and the retention of the tooth to which it belonged, it will readily be seen that no conduct could be more injudicious or more likely to result disadvantageously.

To the existing irritation of contiguous inflammation would be added that of mechanical violence.

To a condition which imperatively demands *rest*, and *possibly* such aid as would be given by the prevention of occlusion, the application *to the gum* of soothing medication, or even the slight touch of some *counter*-irritant, as dental iodine (gently), has been ruthlessly added all the useless burden of sustaining additional and prolonged shock from a necessarily lengthy and painful manipulation.

Pressure upon the tooth is painful, drilling open the pulp-cavity is painful, extirpating the pulp in this condition is painful, and *all* is *worse* than needless, for it is *detrimental.*

But if everything is permitted to remain undisturbed, all trouble will pass away, usually in a few hours, certainly in a day or two.

Now it is that the final process *begins*,—death of the canal portion of the pulp having occurred, *sloughing* of the dead tissue is the natural sequence.

Sometimes this is followed by a shriveling and drying up of the remains; this is the condition which is known by the expressive term of "mummified," and is a sequence which is too infrequent to possess any practical value.

As a general rule, after sloughing follows gradual disintegration, with its fluidity of tissue and evolution of mephitic gas, for which reason "extirpation" of the pulp should be the sequel to arsenical devitalization.

3d. *Duration of application.*—It is now more than twenty years since I began to doubt the truth of the "inflammatory and tooth-destroying" results of arsenious treatment attributed to "length of duration of application," from the fact that on various occasions patients had from sundry reasons neglected presenting themselves at the time appointed for the removal of pulps, and had allowed a number of days, weeks, or *months* to elapse, which were, according to the books, sufficient to induce great trouble and even loss of the teeth, but, to my surprise and gratification, nothing in this direction supervened.

An occasional story of pain, an occasional day of tenderness, which had passed away, made up the total; and, seeing no reason for other treatment than extirpation and plugging, these were performed, and some of these teeth are yet doing duty, as veterans of twenty years of pulpless service, with every indication of still remaining useful for a long time.

(To be continued.)

ON THE PHENOMENA OF PAIN.

BY E. W. FOSTER, M.D., BOSTON.

(Concluded from page 298.)

(C.) Our third and last division of questioning is one touching the mode and manifestation of the physical phenomena of pain,—its perception interiorly by subjective symptoms, and its objective revelation, especially as displayed by the reflection of pain on the motor nerves, and these to the motory muscles. It is written as a law in physiology, that sensations conveyed by an afferent nerve to some ganglionic center are generally reflected by an efferent nerve to those muscles which lie in the line of such reflection, causing thereby muscular contraction and motion. Involuntary pain in its reflections usually induces contractions in those muscles most habituated to motion, and the easiest to play upon and control, by reason of their nearness and the peculiar nature of their normal offices. In moments of sharp agony, when the great influx of pain finds sudden and unexpected vent in explosive cries and groans, it is pain that has been reflected along the efferent motor nerves to the muscles of the tongue and those of the vocal organs; and the body says, in ear-piercing tones, it may be, that pain of the most dangerous kind has entered the citadel, and there is at once a panic among the otherwise peaceable and comfortable sensations. Arcadia is thus suddenly transformed into a Babel of confusion. Surplus force may next find exit by the facial muscles—most usually the case—in grimaces, or contortions, showing that pain has reached them also. The arms next would most likely follow with more or less motion, and in some cases of severe pain and excitement the whole motory system may be convulsed by the task of expressing the objective symptoms of its terrible unrest. Muscular action, we see by these and other similar illustrations, is the most common and most direct mode of liberating nervous tension, whether induced by great pain, by great mental distress and anxiety, or by very joyful emotions and sensations.

Every influx of force, by light or severe pain, must therefore be disposed of and dispersed in some direction. The necessity is vitally imperative, both as concerns the physical safety of the nerve and the far greater safety of reason itself. All moody and melancholic temperaments are capable of more suffering than those who are ever active in their griefs and pains. The child that cries at every little trouble can never suffer to the extent of the one silent, shy, and reserved. In the one case, the influx of force has discharged itself at once, and one need not fear any scar in memory, while that of the other's sufferings are the more indelible because the force of influx, —the same in both cases, we will suppose,—not finding a ready outward relief, is sent back into the more remote, unfrequented, and gloomy chambers of thought, and there, in the ashes of grief and unresolved pain, the mind becomes more self-suffering than ever. This introverted force may be brought outward, and so dispersed by healthy bodily exercise through natural muscular channels; and, with a variety of wholesome contemplations for the mind, the result will be desirable and healing.

Those persons whose sensitive areas are exalted and extensive, and who thus exaggerate nearly all perceptions, are always active in muscular or mental directions, likewise are passionate and energetic in such directions, as this great influx of force, which is constantly pouring in upon the nervous centers, may take, according to the special organism and trend of nervous reflection.

All moments of extraordinary hazard have a most striking effect upon such highly endowed organisms, who in these traits add most, perhaps, to the variety of human nature, as expressed by its outward signs and symbols. We mentioned the fact that pain could not command in certain high-souled states, as in the exalted heroism of the soldier, and others pressed and sustained by lofty hopes and ideals; so also, the will alone may be indeed sovereign over any outward manifestations of pain.

In high states of personal danger this tremendous pain-force, that should seek outward expression through muscular motion,—which motion, aided and encouraged by reason and instinct alike, would snatch the body away from its imminent peril,—is now held, perchance, in the grasp of a strong will, ignoring other parts, muscles and organs, that now are not allowed to afford their customary relief.

Any overwhelming apprehension of great personal danger, diverted from outward expression, must find exit for discharge elsewhere; and in some cases, or perhaps all, more or less, the force will be discharged into the region of the viscera, and we may have as a result syncope, and transient arrest of the action of the great pneumogastric nerve, and also a greater or less extent of disaster upon the heart. Digestion may be arrested or impeded, and the intestinal canal refuse to carry its burdens.

Women, being generally more susceptible of impressions than men, have on this account a saving clause in their constitution,—not but that men have the same in its effect, but it is more seldom accepted,—and this is the readiness with which women faint or swoon away, and when less than this, the readiness with which the most ear-piercing screams shiver into a thousand fragments the surrounding air at any considerable influx of unwelcome emotions. The first defines a limit in the consciousness of pain, the second is a sudden and easy exit of high emotion, through muscles near at hand, and generally always available for use,—the vocal organs.

Further, if once fainting or once screaming does not suffice to satisfy the great and sudden influx, more fainting or more screaming as the case may be, or even both, may rapidly follow. These are physiological safety-valves, which added to muscular action are always merciful in their intent; and we may remark, in passing, that mercy as a quality has its root thus postulated even in the physical constitution of man.

Pain or insult, again, may be reflected in other ways. In a brave and resolute man both may be reflected along the biceps, and result in good sturdy blows on the offender; while, on the contrary, pain or insult poured in upon a timid or cowardly man would most likely be reflected into his legs, which, with a zeal worthy of a better cause, sometimes take up the craven body, and bear it swiftly off to a place of safety.

Pleasurable and comfortable surroundings pour in upon us from all sides, happy and satisfactory impressions, and every tactile and terminal sensory corpuscle may be said to have an open mouth, drinking in the glories of an agreeable environment. This equable glow of comfort is refreshing beside the hot blood which pain, anger, and untoward excitement may produce. Hence pleasure, or comfort, at least, is inherent as a desire in the mind and body alike. But through excess of use and abuse of this natural necessity the other extremes of pain, displeasure, and discomfort are reached.

In the ancient and well-known order of inflammation, as *dolor*, *calor*, *tumor*, *rubor*, pain ranks as first in the line of importance. Yet there are some exceptions to this order. For instance: in the agonizing pain of some spasms we have no inflammation, no redness, no swelling, and, on the other hand, in many forms of inflammation we may have no pain. Pain also varies in its expressions according to the elasticity of the part thus affected; hence affections of the bones, joints, and of the head, are generally more painful than diseases of the skin, or fleshy parts of the body. Heat and swelling, *calor et tumor*, as products of inflammation, and of pain as well, are more or less changeable in the order set above. *Rubor*, or redness, is not necessarily a concomitant of pain and inflammation, for in many of the most terrible migraines and neuralgias we may generally have, as an indication, great paleness, the face bearing even an ashen or livid hue, which is more or less due to the fact that pain is being reflected along the vaso-motor or sympathetic nerve-branches which govern or control the arterial and capillary systems. The cornea, also, may have a slight inflammation without redness, also the arachnoid membranes of the brain, likewise sheaths and tendons. Pain, therefore, that appears first in the above order, is a law unto itself, for it may exist without any of the above attributes of inflammation to all external appearances; but, as we have pointed out, from internal and structural changes in the nerve itself, pain may be the cause of such changes, or in turn be caused by them.

Pain, simple and transient, like certain forms of inflammation which are light, and incident to many normal functions, is, or may also be, physiological in its action and motive. The pains of growing childhood are not pathological; nor those of parturition, in its normal function; nor those of normal dentition, and other processes of growth and procreation; but all may, of course, when perverted, lead to pathological termini. The mammary excitement of the mother, the sudden suffusion of the face at the unexpected meeting of a friend, as in pleasant surprise and other similar instances, give us the physiological side of inflammation; and, strange as it may seem, this form does not always need the physical sight or contact of the subject, for it may readily come from a thought, from a vivid memory, or anticipation.

An epicure, for example, who smacks his lips in anticipation of some rare old wine, does so from a reflected force along the nerves of taste; he will twice enjoy his wine, first in prelibation, and second in realization.

Both pleasure and pain find it necessary to employ the mobile and expressive muscles of the face to herald their coming or presence. In this regard it becomes an interesting study of physiognomy to observe the wondrous and indescribable subtlety of facial changes, as for instance, when painful emotions or sensations now strongly depicted in the face are all at once, as if by magic, substituted for a sudden smile of joy or the returning state of placid comfort. Plato long ago observed that one of the greatest of pleasures was the sudden relief from pain. This is probably an axiom in our experiences. The rapid facial changes indicating the substitution of joy for pain, and, on the other hand, pain for former peace and comfort within, are daily seen in our walks and observations among men, yet they cannot be reproduced on canvas, for here only the ghost of a present emotion, whatever it is, can be fixed. It is in drama or other character imitations that man himself can simulate his own deeper realities. It is not that the artist cannot see these wondrous changes that he cannot reproduce them, for they play in the features of every face he meets, more or less. It is because they are too subtle, too kaleidoscopic, too transient, that the memory of only a certain one out of the many can be fixed and put upon the canvas. The canvas cannot change the aspect put upon it by the artist, but it derives its value to us by the very reason of its fixity, which may call to mind a similar one, or suggest an agreeable variety of emotions instead, within us.

Though we may always observe the direction of external manifestations of pain in others, and feel its importance in ourselves, we may well agree with Spencer, that we are totally unable in another sense to comprehend how the excitement of certain nerves should generate this feeling while in the production of consciousness of physical agents acting on physical agents; but he further adds, that it is a mystery never to be solved, for he would regard it as among things unknowable.

It may be so, and the book of this knowledge be forever sealed to us; but may we not be allowed the hope that some things which now vitally concern us, and are still unknown to us of to-day, some one of the great to-morrow may dissolve in his mental spectrum? Life, with its motives and causes, its Genesis and Exodus, will ever be of profound concern to those who would seek to know the secrets of their conscious lives, but to all such deep and pertinent inquiries shall there be no more answers?

We have shown with regard to pain that in a certain sense it may be called a remedial agent, an agent for good and for protection, as it may become also an agent of disease and of destruction to the physical body. It is the terrible avenger of injured and wronged nature, or, paradoxical as it may seem, it is at other times the merciful one that interposes to save in seasons or moments of great risk and danger to life. To the battered and wrecked hulk, full of the infractions of physical laws, it again, in mercy, yields its command to death, so peace and rest come at last to mortal agony.

With each one bringing his mite to swell the common endeavor for its suppression, pain at last will be largely swept away.

SOME OF THE EFFECTS OF RIGGS'S DISEASE ON THE GENERAL HEALTH.

BY GEORGE A. MILLS, BALTIMORE.

(Continued from page 256.)

Standing on the basis that physiology is the normal standard of health, and pathology a varying standard below the normal, we are called to face the fact that we do not find any organizations in the human family which measure up to the normal standard, because disease has become resident through the infraction of law, and its presence has continued to be an element of discord. In proportion to its power to act on the offensive, its progress is noted in the lowering of the standard of health. All disease impairs to a greater or less degree the nutritive processes. Anything that causes a deficiency of quality, or deficiency in the quantity, of the fluids which are first met with by food on its entrance into the oral cavity, is a hindrance to proper nutrition, and undoubtedly makes an injurious impression on the stomach. It is a rational thing to admit that the simplest expression of the disease in question does commence its work of deterioration on the fluids of the mouth, both of the quantity and quality, and continues to do so in varying degree. In the advanced stages mastication is interfered with, producing additional mischief to the stomach, the teeth become loosened and tender, the masticating power is necessarily weakened, and the food goes into the stomach in an unfavorable condition for digestion, producing a marked impoverishment of the blood, ending not infrequently, I am confident, in inanition.

Facial neuralgia is not uncommonly associated with this disease, both in limited and general expression. The dentist is often called upon to examine such cases, and because no tooth is found decayed the patient is dismissed without treatment, though the suffering may be wholly traceable to this disease, and the proper treatment of it would give complete relief, and this when only one or two teeth are involved. When embracing a larger number of the teeth, the suffering often becomes excruciating. Where the presence of this disease is general, in the first or last stages, a very unhealthy and fetid condition of the secretions is exhibited. In the advanced stages extreme lassitude, nausea, and loss of appetite are experienced. A copious flow of yellow, glairy fluid, sometimes mixed with blood, and sufficient to leave a large stain upon the pillow, is not infrequent. I have it from several lady patients (one I am now treating) that they are in the habit of placing one or two handkerchiefs under their mouths to take up the flow at night. Of course only a portion of that which accumulates in the mouth is thus discharged, the rest necessarily passing into the stomach. Many cases can be vouched for (several of them having been seen by myself), the details of which would seem almost incredible. The proof that the trouble was directly traceable to this disease is to be found in the fact that cure follows the treatment. I *know* of some cases which were very near death's door, and have been restored to a good degree of health by nothing more than the radical treatment of the diseased gums and surrounding tissues. Many persons have carried this horrid affliction year after year, enduring untold depression of spirits, associated with fainting fits and almost complete prostration. A case was detailed to me by some friends in New England of one (who held the position of chief-justice of the State in which he lived) who, I have no doubt, died solely from this trouble. His case was thoroughly examined by one of the most prominent physicians of New York City, and he was given over to die. The state of his teeth was noticed by this physician, who suggested the removal of them, as possibly their condition had something to do with his sickness. The representations by his friends of the condition of his teeth, his loss of appetite, and the copious flow from the mouth while sleeping, are very strong evidence to me that his slow death came from inanition, traceable clearly to this disease. I believe the extraction of the teeth would have prolonged his life. I told a patient, whom I am now treating, that if I could not make a decided improvement in her case and save many of her teeth so that they would be of comfort and use to her, it would be advisable to have them all removed. In this case there are twenty-six teeth, around every one of which was oozing pus when I commenced to treat them. This patient has been under the care of prominent dentists from childhood, and she has never had any encouragement that there was a remedy. She is a lady of wealth and culture. I simply refer to the facts to substantiate what I have before said on this subject. I hope I have said enough to excite the interest of the profession in the matter. In my next article I will give some directions as to the method of treatment with the instruments devised by Dr. Riggs, of Hartford, Connecticut.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the society, held at the residence of Dr. J. Adams Bishop, 32 West Thirty-sixth Street, on Tuesday evening, February 20th, 1877.

President A. L. Northrop in the chair.

Incidents of Office Practice.

Dr. C. E. Francis. A day or two ago a lady who had broken the buccal cusp of the first superior bicuspid on the right side presented herself. The tooth had in it a large gold-filling, leaving the walls very frail. With my burring-engine I cut away the remaining portion of the enamel as far up as the gum, removing also a portion of the gold-filling. The gold was very solid, and I had trouble to cut it away. I ground an eye-tooth to fit nicely, and then took a band of platinum and riveted the tooth to it, bending the ends around the natural tooth. The eye-tooth and platinum were removed and the joint soldered. I then slipped the artificial tooth over the natural tooth, using oxychloride to make a tight joint, and after a few minutes filled in with gold, malleting it firm, and making the whole thing as solid as any one could wish. It made a very handsome tooth, and looked as though it grew there.

I have repaired many teeth in this way, and never had but one fail.

Dr. W. St. G. Elliott. I wish to report, while we are speaking of incidents of office practice, a case that came under my observation some years ago. The patient, a man of some thirty years, was brought to me by a naval surgeon, with the request that I should take charge of the case and do whatever was necessary. Upon inquiry, I ascertained that a few hours previous he had been to the race-course on horseback; that while there his horse became unmanageable, and he was thrown upon the ground, and it is supposed he was stepped upon by his or some other horse. Upon examination I found much laceration of the soft parts and considerable hemorrhage. Both of the superior maxillary bones were detached and quite loose, while four of the teeth (three incisors and one canine) were nearly detached from their sockets. There was also a compound comminuted fracture of the lower jaw. On the right side, at the point where the bicuspid should have been, spiculæ of the alveolus were protruding at several points, as was also a part of the anterior portion of the body of the jaw. The patient was sent to his hotel, and after the swelling had somewhat subsided the treatment commenced. Taking a roll of gutta-percha, about one inch in diameter and three and one-half inches long, it was thoroughly softened in warm water, curved to the form of a horseshoe, and introduced between the teeth of both jaws. The superior maxillary being held in position by an assistant, the detached portions of the lower jaw were placed in apposition, and while the remaining teeth were in line, they were, together with the entire lower jaw, forced upward, thus taking the bite, as it were, in gutta-percha. This was then removed, hardened by cold water, and three separate portions of the intermediate material were removed, making three large oval holes, one in the center and one at each side. These holes were as large as the substance would permit, extending as they did nearly to the impressions made by the teeth in the gutta-percha. The intermediate material, now in the form of imperfect pillars, was left sufficiently strong to withstand the necessary force to be applied by bandage to the chin. When the appliance was placed *in situ*, and the bandage applied, the patient expressed himself as quite comfortable. The case progressed favorably, so that in three weeks the splint was removed, the parts having firmly united.

During the course of the treatment the splint was from time to time removed and cleaned, and as there was evidence that two of the incisors were not going back to their proper places, pressure was applied by slightly changing the impression made by them in the splint. This was quite successful; the patient experienced no difficulty either in breathing, washing out his mouth, or in taking food through the holes made in the splint.

Dr. E. A. Bogue. I had the other day a case in which some cavities in the central and lateral incisors were conspicuously visible. The young lady had had gold-fillings removed and gutta-percha substituted. In the effort to do something better, I ground down some pieces of porcelain cut from artificial teeth, carefully fitting these to the cavities of decay, and set them in with mastic by pressing them to their place with a hot iron. I saw them to-day, and I do not think any one would know the teeth had been filled or decayed at all, looking at them from a distance of a foot or sixteen inches. I wish to know if any gentleman can tell how long those fillings will last? The mastic was put in by heat, and not in solution, as was formerly done by dentists.

Dr. A. C. Hawes. I had occasion some time ago to fill, for a young lady, two central incisors which were badly decayed on the labial surface. The cavities were so large that gold plugs would have been very conspicuous. I selected plate teeth, quite thin, of a proper color, ground them down until they fitted the places as exactly as possible, and fastened them in with osteo-plastic. This was over a year ago, and they remain very perfect up to this time, and three or four feet off you would not know the teeth were filled.

Dr. W. S. Elliott exhibited an ingenious instrument invented by himself, called the "amalgam porte," for picking up and carrying amalgam to cavities.

Dr. A. H. Brockway offered for inspection some "lava strips," to be used in finishing and polishing approximal plugs, manufactured by a Mr. Holly, of Brooklyn.

Dr. C. E. Francis mentioned and recommended an instrument invented by Mr. Fletcher, for moulding amalgam into convenient sizes for carrying to cavities.

The president exhibited some new forms of files, polished on the *safe* side, for finishing approximal plugs.

Dr. E. A. Bogue read a paper upon the subject of Dr. Cutler's paper on "Transplantation and Replantation," read at the last meeting. Before reading, Dr. Bogue remarked as follows:

Our friend, Dr. Bing, formerly of Maryland, is now practicing transplantation and replantation in Paris. I think his claim is, or at least some of his patients claim, that he is the originator of the process. He is doing it with great success, and yesterday I had a patient with two teeth in her mouth that were transplanted by him two years ago. Their condition was extremely good. They were both upper cuspid teeth. The right-hand one was firm, and of good color. The left-hand one had no alveolus on the lower part of the labial surface for about half the length of the root. Upon looking underneath I found that the gold-filling in it was defective; indeed, about a third of it was gone. I therefore removed and replaced it with another filling. I found the root filled with floss silk. The appearance of the gum was perfectly sound and healthy.

I want to say that I was disappointed and displeased at our last meeting that no one stated before the society that this operation was supposed to be exceedingly dangerous, and no one recounted the cases of failure, some of which have proven fatal. It was in this view mainly that I began to gather these experiences together which I shall read.

Dr. Bogue's paper was entitled "Notes of Transplantation and Replantation of Teeth."

I hold in my hand about fifty references in regard to "Transplantation and Replantation of Teeth." These references range all the way from 1777 to 1877, and they are all records of experiences.

These experiences are as various in their character as the persons who recount them; but they all tend to show that there is no physiological reason why replantation when necessary, and even transplantation under proper conditions, should not be successful. Benjamin Bell asserted that when he wrote it had not been half an age since English surgeons classed it among regular operations. (Am. Lib. Den. Science Dèsirabode, vol. vii. and viii., page 365, republished 1847.)

Indeed, it is not long since an old engraving illustrative of the manner of transplanting teeth in 1787 was republished in the Transactions of the Odontological Society of Great Britain.

This would show, even if there were no cotemporaneous literature on the subject, that the operation was somewhat general.

We find, however, as before stated, many references to it, and the further statement that the practice first fell into disfavor in France; whether from lack of skill on the part of French "surgeons practicing dentistry," or from the very wide prevalence of infectious diseases liable to be transplanted with the teeth, does not appear. In Philadelphia, in the winter of 1785–86, Mr. Lemayeur transplanted one hundred and seventy teeth, and not one succeeded, according to Gardette. (*Am. Jour.*, 1850, page 65.)

Hunter was probably the most scientific and careful advocate of transplantation, and he says that he does not believe it possible to transplant an infection of any kind from the circulating juices, yet it seems certain that a number, although perhaps a very small proportion of the whole, have presented such symptoms and ended in such disaster as to throw doubt upon his conclusions in this respect; and lest those who are not as well qualified to judge as Hunter was of the health of their patients should be led to experiment without due care, I will quote two or three instances in which disastrous results are said to have followed. In vol. x., 1850, of the *American Journal of Dental Science*, page 66, Gardette says, "I was *informed* that a young lady of New York, Miss S., had a large front incisor transplanted in the upper jaw which produced a disease judged by the physicians who attended her to be lues venerea. This young lady was so affected by the disease that notwithstanding all the medical aid given her her health declined, and, after considerable suffering of mind and body, she died. I was also informed that a Mr. T., of Virginia, had a front upper incisor transplanted about the year 1790, by the same dentist, which occasioned much inflammation in the gums and eyes. After some time the ophthalmia became severe, and other symptoms justified the opinion that the lues venerea had been introduced into the system by the transplanted tooth, which no doubt was taken from an unsound subject. I was informed at the time that Mr. T. had lost his sight, and that after lingering for some considerable time he died." It will be noticed that the writer was *informed* of these results,—he does not speak of his own knowledge.

The last is taken from Koecker on "Diseases of the Jaws," and is copied by him from the Medical Transactions of the College of Physicians of London, vol. iii., pages 325 and 338; and in the same book, Koecker, occur the following passages, which I quote to show how much of an authority this writer would be at the present day. Speaking of surgical diseases of the jaws, he says that the local predisposing or remote causes are, among other things, all improper and improperly-performed dental operations, and among them are breaking out teeth, transplanting from one mouth to another, injudicious insertion of artificial teeth, replacing of teeth that have been extracted by mistake, or to render them incapable of being painful, etc.; then he proceeds to condemn such replacement as being "opposed to all sound views of dental pathology." He includes in this condemnation the destruction of the pulp by arsenic, and says it is "never effected without involving in necrosis some portion of the walls of the pulp-cavity of the tooth." He regrets to observe that Mr. Tomes is also an advocate of this destructive treatment, which is utterly at variance with physiology.

The following is the case that he quotes: "An unmarried lady, twenty-one years of age, had one of the incisor teeth in her upper jaw affected with caries; it was extracted, and its place very dexterously supplied by a like tooth from another young woman, who, upon a most rigid examination for the purpose, appeared to be in excellent health. The implanted tooth very rapidly took a firm hold, and soon bade fair to be of great service and ornament.

"In about a month, however, the mouth became painful, the gums inflamed, discolored, and ulcerated. The ulceration spread very fast; the gums of the upper jaw were destroyed and the sockets left bare. Before the end of another month the ulceration stretched outwardly over the upper lip and nose, and inwardly to the cheeks and throat, which were corroded by large, deep, and fetid sores. The gums soon became carious, several of the teeth successively dropped out, and these at length were followed by the implanted tooth, which had hitherto remained firm in its place. About that time also blotches appeared on the face, neck, and various parts of the body, many of which became painful and extensive ulcers. A considerable degree of fever, apparently hectic, was excited; a copious and fetid discharge flowed from the mouth and throat, and impeded sleep, and the soreness of the parts which performed deglutition prevented a sufficient nourishment from being swallowed. Medicines, exhibited in every possible form that science matured by experiment could suggest, failed altogether of removing or even mitigating the unhappy sufferer's distresses; the virulent taint or putrescent tendency established in the system, though occasionally driven back, as often rallied and ultimately prevailed; the patient fell a victim to it in the greatest anguish and misery. The person from whom the tooth had been taken had all along continued to enjoy the most perfect health; she was frequently and scrutinously examined, without a single trace of disease being discovered existing in her person or constitution."

From this it will be seen that while transplantation was practiced for forty or fifty years at least, we have obtained the record of not more than three or four well-authenticated cases where the results are any more disastrous than those that frequently ensue from an abscessed tooth. In other words, a certain number of these cases failed to tighten; others, after becoming firm, loosened again, and perhaps came out, while the cases that had a fatal termination seem to have been copied and re-copied and continually alluded to until their importance has been greatly magnified.

It is important to notice, in connection with this last case cited, that the patient from whom the tooth was taken not only seemed well at the time it was extracted, but remained well through the entire sickness and death of the other patient, and for a long time thereafter, thus offering pretty strong evidence against the communication of any disease from one to the other.

It is surprising that such an account should have passed unchallenged down through so many years among a class of men to whom erysipelatous inflammation is more or less familiar.

In the Transactions of the Odontological Society of Great Britain for 1874–75, occurs nearly the following description, to which a few words are added from Hunter himself:

The operation of direct transplantation of teeth, a freshly-extracted "scion" tooth being inserted with the least possible delay in the socket from which an unsightly tooth had just been removed, is described by John Hunter with some little detail, and in terms which would lead one to suppose that it was something of a novelty in his time. (Hunter was born in 1718 and died in 1783.) The fact that it should have been made the subject of a caricature by Rowlandson, and the gist of some passages in the pages of Hunter and other writers, seems to indicate its having been practiced with considerable frequency; so that it had become well known to the public, and was not a mere curious experiment performed by a few practitioners only.

Nevertheless, although it seems to have come rapidly into favor, its popularity was very short-lived, for in 1810 we find a writer speaking of it as quite abandoned. The manner in which the operation was performed we may gather from Hunter's work ("The Natural History of the Human Teeth," by John Hunter), of which contemporary writers made very free use, as is indicated by internal evidence in their own books. "A fresh tooth, when transplanted from one socket to another, becomes to all appearance a part of that body to which it is now attached as much as it was of the one from which it was taken; while a tooth which has been extracted for some time, so as to lose the whole of its life, will never become firm or fixed; the sockets will also in this case acquire the disposition to fill up, which they do not in the case of the insertion of a fresh tooth."—Hunter, page 58, Part I.

Just here I will read the following extract from Part II., page 95, of the same book, where quite opposite conclusions are reached:

"If the appearance be not favorable, and it therefore be not probable that the scion tooth can be introduced so as to unite in the place of the stump, I would recommend to every dentist to have some dead teeth at hand, that he may have a chance to fit the socket. I have known these sometimes last for years, especially when well supported by the neighboring teeth. Indeed, this very practice is recommended by some dentists in preference to the other. But even this should not be attempted unless the socket is sound and pretty large, as the tooth can otherwise have but very little hold.

"Whenever there are gum-boils I would not recommend transplanting, as there is always in such cases a diseased socket, although the disease has originated in the tooth. In one or two instances, indeed, which I have seen, the boil has been cured by such an operation."

Again, on page 98, Book II., Hunter, "The insertion of a dead tooth has been recommended, and I have known them continue for many years.

"If this always succeeded as well as the living, I would give it the preference, because we are much more certain of matching them, as a much greater variety of dead teeth can be procured than of living ones. But they do not always retain their color, but are susceptible of stain. However, I have known them last for years without any alteration; and some have appeared rather to acquire a transparency, which dead teeth in general have not." Now, returning to the description of the operation: "The scion tooth, or that which is to be transplanted, should be a full-grown young tooth; young, because the principle of life and union is much stronger in such than in old ones. It will be scarcely necessary to observe that the new teeth should be perfectly sound, and taken from a mouth which has the appearance of that of a person sound and healthy; not that I believe it possible to transplant an infection of any kind from the circulating juices, although we know from experience that it may be done by a matter secreted from them."

While insisting on the necessity of the tooth fitting accurately, or rather being a little smaller, he adds, "The best remedy is to have several people ready, whose teeth are in all appearance fit; for, if the first will not answer, the second may. I am persuaded this operation has often failed from a tooth being forced in too tight. A part of the soft covering of the tooth, or lining of the socket, is squeezed between two hard bones, so that all circulation of juices is prevented; a mortification in that part takes place, and, in consequence of that, a gum-boil, and the loss of all union between tooth and socket, so that the tooth drops out.

"It will be hardly necessary to mention that the sooner a scion tooth is put into its place the better, as delay will perpetually lessen the power upon which the union of the two parts depends." (Hunter, p. 97, *et seq.*)

The following extracts from contemporary writers will serve to indicate the opinions held of the operation at the date of the publication of the caricature. Thus much being premised on the patient's state:

"If the dentist makes a proper choice of the tooth to be transplanted, and takes it from a young, healthy person (the subject from whom teeth are taken for this purpose cannot be too strictly and closely examined; for experience warrants the assertion that the venereal virus may be communicated by this means), and conducts himself through the operation with judgment and dexterity, the patient may expect success equal to his most sanguine wishes." ("A Practical Essay on the Human Teeth; to which is subjoined an Appendix, exhibiting the author's charges for the several operations he performs. By Paul Envialius Jullion, 1781.")

"A dead tooth, when properly prepared, has been found to fasten as firmly, and endure in some instances for near as long a time, as a tooth taken immediately from a living subject."

Elsewhere the writer gives his charges thus: "Transplanting a living tooth, £5 5*s.*; transplanting a dead tooth, £2 2*s.*"

Berdmore speaks of the operation in less favorable terms, as exemplified by the accompanying extracts:

"The few instances in which they succeed surely are not sufficient to counterbalance the hazard; and were these people properly versed in the dentist's art, they would certainly prefer the healing of the socket, and the use of a well-constructed artificial tooth or a human tooth with the root filed off, and formed to fit the void place exactly; for this will occasion none of the evils that attend the former practice, which is not only precarious, ineffectual, and dangerous in general, but also immoderately expensive; for it is not to be supposed that any young person will sell a handsome, sound tooth, to be torn out of his head, without being extremely well paid for his loss and pain.

"In many instances where this transplanting of teeth has been thought to have succeeded well, I am of opinion that a new crown has been grafted to the old root, or the extracted tooth has been replaced, and the patient has been made to believe that a new tooth, extracted from another person for the purpose, is placed and made to adhere in this manner." ("A Treatise on the Disorders and Deformities of the Teeth and Gums. The whole illustrated by Cases and Experiments. By Thomas Berdmore, of the Surgeons' Company, and Surgeon-Dentist to his Majesty, 1768.")

Even in 1783 the operation seems to have been upon the wane, and Wooffendale ("Practical Observations on the Human Teeth. By R. Wooffendale, 1783") mentions the frequent occurrence of gumboils, and other objections to it:

"The transplanting of teeth is a desirable operation when it succeeds, but it may not be improper to observe that its success in a great measure depends upon chance;" adding, "There is an operation I have frequently performed with success, though not always. It is, when a tooth gives pain, and the nerve cannot readily be destroyed, to take the tooth out, stop the hollow with gold, and replace it. Having this operation performed carefully, the tooth so replaced will often answer as well through life as if it had never been diseased."

In 1810, it is said, "It was once a very popular practice to substitute a complete tooth in the place required. When it succeeded, the transplanted tooth in general remained only a few years; from such circumstances it gradually sunk into disuse, and is now, we hope, consigned to its merited oblivion." ("A Popular Essay on the Structure, Formation, and Management of the Teeth. By John Fuller, Surgeon-Dentist, 1810.")

Although it is exceedingly unlikely that the operation of transplantation will be again in any form revived, there is something to be learned from the fact that teeth so treated did, in many instances, become secured in their new sockets.

The ordinary cause of failure in transplantation appears to have been alveolar abscess. But it is noteworthy that Hunter, although speaking of transplanted teeth as being occasionally ejected by the entire absorption of their roots, and as being liable to decay, makes no mention of their liability to blackening or discoloration; so far as it goes, this omission points to vascular communication with the pulp having been sometimes re-established, so that the pulp did not perish. That it may be seen how this subject was treated by certain writers of good reputation, I will make the following extracts from Jobson—Am. Lib. Den. Science, vols. iii. and iv., page 107, *et seq.:*

"This operation, the most revolting and unjustifiable of all that have ever been performed on the teeth, or any other part of the body, is now completely exploded from the practice of the modern dentist. The argument which Hunter uses in its commendation, and the directions he gives for performing the operation, are so absurd and inconsistent that, were it not well known to have been a favorite practice of his, posterity might well believe that this part of his work was surreptitious. A strange way of obviating the difficulty (of not being able to fit the socket with a living tooth) is, however, suggested, for he adds, 'When indeed a grinder is extracted, and the socket is sound and perfect, the dentist may perhaps be able to fill it with a *dead* tooth.'

"It is surprising, indeed, that such an idea should ever have emanated from so profound a physiologist as Hunter; and proves how much a man's better judgment may occasionally be biased when in the pursuit of a favorite object.

"So attached was Hunter (and, I believe, the greater number of his contemporaries) to this unscientific operation, that even if, in the number of the unfortunate individuals thus selected for abuse, a tooth of the requisite form was not to be found, he still suggests the propriety of transplanting, and recommends 'a dead tooth to be taken by the dentist and filed down to fit the socket in which it is to be placed, and afterwards fastened to the other teeth with the silk, or sea-weed. The patient,' he observes, 'must now finish the rest. He must be particularly attentive at first, and give it as little motion as possible, and must take care not to catch cold, or expose himself to any of the other common causes of fever.'

"It is unnecessary to enter into further detail of a practice so unjustifiable and absurd that it must always remain a matter of surprise that John Hunter ever countenanced it.

"He himself, indeed, admits that 'this operation, like all others, is not attended with certain success. It sometimes happens that the parts do not unite; and in such cases it often acts as an extraneous body; and instead of fastening, the tooth becomes looser and looser, the gum swells, and a considerable inflammation is kept up, often terminating in gum-boils.

"In some cases also, where it is not attended with success, these symptoms do not exist. The parts appear pretty sound, only the teeth do not fasten, and sometimes drop out.

"In conclusion, I would observe that no one would now be justified in reviving this operation for the purpose of experiment; and still less, from more improper and interested motives; as, besides the cruelty of it to the unfortunate class of beings from whom the teeth were generally taken, it frequently led to the introduction of deplorable infectious diseases into the constitution; and is, to say the least of it, a practice unscientific in its nature, and unfortunate in its results."

As a comment on the above, it will be remembered that no purely dental hospitals or infirmaries existed in those days, where many good teeth are extracted, which if not transplanted are of no further use to any one.

What deduction can be made from these records?

So far as I am able to judge, this: that from the days of Hunter on until the practical abandonment of this operation, about 1820, teeth were transplanted and replaced without regard to what we now look upon as essential conditions, and yet the percentages of success were such as to cause those operations to be classed among the regular operations of surgery.

Now, what is meant by essential conditions?

I mean to enunciate the proposition broadly, that a dead body or one severed from its vital connection, whether it be in the pulp-cavity of a tooth, or lying out upon the open prairie, will inevitably undergo putrefactive decomposition. I mean to assert, too, that I can find no record save one in which I can place any confidence of the reforming of vital connection between the replanted or transplanted tooth-pulp and the socket into which it has been placed. Indeed, the process of luxation was devised for the special purpose of breaking, and thereby destroying, vital connection between the pulp and the soft parts within the socket, for the cure of toothache, long before the use of arsenic was thought of for the same purpose.

The single exception to this rule was in the case of the tooth which Hunter "transplanted to the comb of a cock," and which was the only success after many failures.

This tooth is now in the museum of the College of Surgeons in London. It is a cuspid, about half grown, and with the apical foramen about as large as a small quill.

I think we may safely conclude from this that no teeth transplanted in actual practice had vital connection renewed in the pulp; hence they had a decomposed pulp within, in precisely the same condition which to-day is known to produce alveolar abscess, and which to-day we know so well how to prevent that I regard an alveolar abscess as an entirely preventable disease; not agreeing with the old writer who said that "the cause of toothache is known only to God."

Again, the antiseptic system has, I think, made some advances in these latter days; if not toward new discoveries, at least toward rediscoveries, with results that have been exceedingly fortunate in the domain of surgery. So that to-day we may reduce to a minimum, if we may not dispose of altogether, the danger of transmitting infectious diseases.

As experience has shown that replanted teeth do equally well after having been out of the mouth some hours as when immediately transplanted while still retaining their animal heat, and as we are pretty well assured that the virus we most dread carries no infection after once becoming cold, we may consider ourselves by so much in a better condition to make this operation successful than were the practitioners of a hundred years ago.

We now approach another part of this subject, and one, I will confess, offering to me far deeper interest than the one just reviewed, viz., the transplantation of dead teeth, or teeth that have long been out of the mouth.

One of our guests at our last meeting pronounced this part of the question "unmitigated nonsense;" and hinted that we should perhaps next be called upon to believe that porcelain teeth could be transplanted and made to grow in the human jaw.

I am disposed to think that this gentleman did not receive his invitation to attend this meeting sufficiently early to enable him to examine into the question that was announced for discussion; for a gentleman who has forgotten more than most of us ever knew can surely not be ignorant of the physiological facts bearing upon this matter, and recorded on the pages of Billroth, Kölliker, and Tomes, and other investigators of that field.

Billroth found that ivory pegs that had been driven into living bones had osteoklasts upon them, and Kölliker found in such a case that Linhard had not only typical Howshipian lacunæ, but also polynucleated giant cells, showing the continued vital action of the parts surrounding the intruding substance. Mitscherlich relates instances of partially successful results from the implantation of dead teeth, in which cases the inserted tooth becomes fastened by osseous tissue which grows into the dentine from the maxillary surface. This observation is quoted also by Wedl,* at the end of a sentence giving his views as to the cause of the results of transplantation, being upon the whole not favorable, because the roots of corresponding teeth, in different individuals, vary so much in thickness, length, and curvation; consequently, the alveolus is either injured or incompletely filled. and the subsequent inflammatory processes prevent the desired fixation.

In conclusion, then, it seems that the weight of testimony in favor of the implantation of dead teeth equals, if it does not surpass, the testimony in favor of transplantation and replantation; while these latter operations, with our present knowledge, offer a field for increased usefulness to our fellows that promises to be of far greater value than was formerly supposed to attach to them.

During the reading of his paper, Dr. Bogue made the following remarks:

(1) It will be remembered that to be "torn out of the head" was a good description of the manner of extracting teeth by the "claw" or "turn-key," as forceps were not generally known at that time, and do not seem to have been used.

Dr. N. W. Kingsley. Fouchard has a lot of forceps illustrated in his treatise, written in 1724.

Dr. E. A. Bogue. True; but the instruments for extracting teeth used by Hunter and those who performed transplantation in those days were very different from these forceps.

(2) Hunter also recommends that teeth should not be transplanted immediately after taking mercury, or while the system is under the influence of mercury in any form. He also recommends that after teeth have been transplanted the patient shall not expose himself to any disease in the curing of which mercury is liable to be used *until the teeth are firmly fixed in their sockets.*

(3) The president. Does Dr. Bogue think the conclusion arrived at in the case reported by Dr. Koecker a correct one?

Dr. Bogue. I have said all I have to say on the subject in expressing surprise that such a case, with so little accurate data, should have passed without challenge before so many medical gentlemen.

The president. I would like to make a statement, which perhaps will be subject to the same challenge. The parties are now living.

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* Wedl, 1872, page 216.

I know a gentleman vaccinated with a scab from another gentleman, who, to the present day, has not had any form of skin disease, his countenance being as fair as a babe's. The gentleman vaccinated never had had any skin disease until after vaccination, and since then he has had that tremendous scourge called salt rheum all over his hands and over a large portion of his body. It was not known in any member of his family before he was vaccinated. There have been some members of the family of the gentleman from whom the scab was taken, traced away back, who had been troubled with that disease.

(To be continued.)

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

The regular monthly meeting of the association was held on Tuesday evening, May 8th, 1877, at the hall of the Pennsylvania Dental College, President Dr. Robert Huey in the chair.

Dr. G. W. Adams reported the following case of irregularity, which he desired should be discussed:

On or about the 1st of May, 1876, a Miss L., aged about twenty-one, called at my office to have a right inferior lateral incisor turned and straightened. Ligatures were applied and the tooth soon brought into position. It was then kept gently tied and very closely watched for some five or six months to prevent its going back. The ties were then removed, and the tooth receded; and before I saw it again it was almost as bad as it was at first. It was easily reclaimed, however, and a rubber plate was then made and inserted, to tie to, which was worn, undisturbed mainly, from about the 1st of December till the middle of April. It had become considerably coated with tartar by that time, and irritated the mouth to some extent, and was removed. After cleaning off the tartar, the tooth was tied up again, without the plate, and so remains to this day. Whether it will ever become firmly secured in its proper position seems doubtful, as it has been under treatment for more than a year.

Dr. Adams said his idea was, that the alveolar ridge was so narrow that there was not sufficient room to hold the tooth in its new position.

Dr. Buckingham asked if this tooth was very sore after it had been moved.

Dr. Adams replied, not more so than is observed in any cases where a change of position is obtained.

Dr. Buckingham said that, as the roots of these teeth are flat, it became an interesting subject which was the best manner of rotating them.

Many of the gentlemen present described how ligatures should and could be tied and applied, how apparatus could be made, and illustrated them by diagrams; but as these were extremely difficult to comprehend by a mere description, or by imperfectly drawn diagrams, the subject became discursive or conversational, of which no report could be made. The general opinion, however, on the case reported by Dr. Adams was that tartar had so insinuated itself on the root of the tooth which he had brought into position that it had incrusted or hardened there, and was beyond the reach of instruments for its removal, and until this was effected the tooth would always remain loose in the socket.

Dr. W. H. Trueman suggested the use of dilute sulphuric acid for the removal of the tartar, and thought the tooth might have been tied too tight.

Dr. Millard spoke of the case of a young girl (brought to him by her father) whose upper right central incisor grew directly forward in a horizontal position, cutting its way into the muscles of the lips and producing what seemed to him a horrible, as well as an irremediable, deformity. He asked for suggestions as to how such a case might be treated.

Dr. Chupein said that Dr. Norman Kingsley had reported quite a number of cases of irregularity, and these were admirably described and illustrated in *Johnston's Dental Miscellany*, as well as the apparatus for their correction. He suggested to Dr. Millard that by an examination of these cases, and the illustrations referred to, he thought he would find one that would cover the case he had to treat.

The general tone of the meeting was that whenever a tooth could be brought into position *without* a ligature, it should be done in preference. Whenever screws could be applied they should, as their action was less irritating and generally more certain. That the mouth should be encumbered as little as possible with plates or appliances for changing the position of teeth, and that whenever nature could be *made* or *aided* to do the work of regulating the teeth by the simple extraction of one or two teeth, this plan should be adopted in preference to ligatures, bands, plates, screws, inclined planes, or any of the plans resorted to for this operation.

Adjourned.

CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

THE Central Pennsylvania Dental Association will meet in Tyrone, Pa., Wednesday, the 18th of July, 1877, to continue in session two days.

JOHN S. MCKIERNAN, *Secretary.*

DENTAL THERAPEUTICS.

It is particularly requested that anything new in means and methods relating to this subject be brought to the notice of the Committee on Therapeutics of the American Dental Association, previous to August 1st, in order that it may be incorporated in the annual report.

Please address C. A. Brackett, *Chairman*,
P. O. Lock Box 708, Newport, R. I.

NEW JERSEY STATE DENTAL SOCIETY.

The seventh annual session of the New Jersey State Dental Society will convene at the Ocean House, Long Branch, July 18th, and continue in session three days. Sessions will be held in the Reformed chapel. We shall be happy to see members of sister societies, and will try and make it interesting and profitable to all who may favor us with their presence. A reduction has been made in hotel rates by the Messrs. Leland, and communication is rapid and reasonable. Any information wished will be supplied by the secretary,

Charles A. Meeker,
27 Fulton St., Newark.

AMERICAN DENTAL ASSOCIATION.

The seventeenth annual session of the American Dental Association will be held in Chicago, Tuesday, August 7th, 1877, and continue in session four days.

J. H. McQuillen, *Corresponding Secretary.*

AMERICAN DENTAL CONVENTION.

The twenty-second annual meeting of the American Dental Convention will be held at Deer Park, Maryland, commencing Tuesday, August 14th. The profession generally is respectfully invited to be present and participate in the proceedings. There is no permanent membership or initiation fee in this organization.

Ambler Tees, D.D.S., *Secretary.*

OBITUARY.

DR. A. P. STEVENS.

At the semi-annual meeting of the Merrimack Valley Dental Association, held at Lynn, Massachusetts, May 4th, Dr. C. G. Davis addressed the association in reference to the death of Dr. A. P. Stevens.

Following the address, resolutions were adopted by the association, expressive of its conviction that, in the death of Dr. Stevens, it had lost one of its most valued members, a worthy citizen, a genial gentleman, and a dentist of more than ordinary attainments and skill.

DR. JAMES H. DEMAREST.

At a meeting of the alumni of the Maryland Dental College, held on May 14th, resolutions of respect to the memory of Dr. James H. Demarest, of New York, were unanimously passed. The resolutions expressed the high esteem in which Dr. Demarest was held by the members, and their appreciation of him as a professional brother and a Christian gentleman.

DR. LAFAYETTE ADREON.

A special meeting of the alumni of the Maryland Dental College was held May 19th, at which resolutions of respect and condolence were passed in reference to the death of Dr. Lafayette Adreon, of Baltimore, Maryland.

PERISCOPE.

Death from the Administration of Nitrous Oxide Gas.—*Sir*,—In your impression of the 7th instant, Mr. Clover, referring to the death of Mr. Harrison of Manchester, while under the influence of nitrous oxide gas for tooth-extraction, suggests the following explanation of the result: "The most probable explanation of this sad case is that the extractions were difficult, and that the patient, on recovering from the effect of the gas, was susceptible to the shock of a severe operation; and that this shock, and not the gas, was the cause of the syncope, which structural disease of the heart rendered fatal."

In the *Lancet* of last week some particulars are given which are inconsistent with Mr. Clover's theory. It appears from this report that Mr. Harrison went to a dentist, Mr. Williams, and, at his own request, the gas was administered by Mr. Williams, assisted by his servant. He did not readily fall under its influence, and, when he became unconscious, Mr. Williams removed two stumps, and then observed that his patient was unusually quiet. Cold water was dashed over the face, windows and doors were thrown open, and Dr. Noble and Mr. Worsley were sent for. When the latter gentleman arrived, the face and neck were livid, the eyes fixed and open, and the pupils widely dilated. Cold affusion, artificial respiration, friction, and the galvanic battery were tried in vain. The body was examined eighteen hours after death by Mr. Jones, pathologist to the Manchester Royal Infirmary, in the presence of Dr. Noble and Mr. Worsley. On opening the chest (the cartilages of the ribs were completely ossified), there was found a large deposit of fat in the anterior mediastinum and upon the pericardium; the lungs were very dark colored and intensely congested. The heart was slightly enlarged, soft, and friable; the left side quite empty, and the right full of dark fluid blood, while there was a considerable deposit of fat in the interventricular furrows. The aorta was coated with atheromatous deposit, and the aortic and mitral valves were thickened.

These are the main facts, and, in my opinion, they afford a remarkable illustration of the particular danger to which I referred in the concluding paragraph of my lecture published in last week's *Journal.* There can, I think, be no question that the immediate cause of Mr. Harrison's death was the impeded circulation through the lungs, the result of arterial contraction, and the consequent overdistention and paralysis of the soft and feeble right ventricle. It will be seen that the condition of the heart's cavities, the right side distended and the left empty, was precisely the same as Mr. Hamilton Cartwright said he found in the two rabbits killed by the gas. The great engorgement of the lungs was doubtless the result of *post mortem* movement and gravitation of blood. If the chest had been opened immediately after death, the minute tissue of the lungs would have been found anæmic, as we found it in the rabbits, and as it always is in cases of sudden apnœa.

It is evident that, before medical aid arrived, the circulation had ceased and life was extinct. The only chance of saving life would have been by the instant performance of artificial respiration at the first moment of alarm. The complete ossification of the ribs must have rendered artificial respiration difficult and incomplete; but the prompt and vigorous employment of the Sylvester method, with alternate compression of the chest and abdomen, might possibly have replaced the nitrous oxide in the lungs and blood by atmospheric air, and thus set free the pulmonary circulation before the distended right cavities had completely lost their contractile power. It will be seen, from the published report of the case, that there is no evidence of recovery from the effects of the gas and subsequent syncope from the shock of the operation, which Mr. Clover hypothetically suggests in his letter to you.

My object in this communication is not to cast blame on any one, but to point out the immediate cause of Mr. Harrison's lamented death, and the means of averting a similar catastrophe hereafter.—*George Johnson, in British Medical Journal.*

Explanation of the Phenomena attending the Inhalation of Nitrous Oxide Gas.—In the phenomena which attend the inhalation of nitrous oxide gas, when given as an anæsthetic, we have a very interesting confirmation of the results obtained by experiments on animals; and, on the other hand, the records of physiological experiments enable us more completely to understand and interpret the facts of nitrous oxide anæsthesia. On several occasions I have availed myself of the opportunity afforded me by the courtesy of the authorities at the Dental Hospital to watch the phenomena which attend the inhalation of the gas, and I will now briefly describe them.

In most cases, during the first few seconds the pulse and the breathing are quickened, as a result probably of emotional excitement. In the next stage, the breathing becomes slow and shallow and the pulse full and firm. Then, after a period which varies in different cases from forty to eighty or ninety seconds, the pulse suddenly becomes almost, or even quite imperceptible, the features become livid, the pupils are widely dilated, there is a state of general muscular rigidity; in short, all the phenomena of the first stage of an epileptic fit are present. The mouth-piece being removed, the morbid phenomena quickly pass away, the features regain their normal color, the pulse returns, and for a few seconds has again a full and throbbing character, but quickly regains its normal condition.

The explanation of the phenomena appears to be sufficiently obvious. It is admitted on all hands that, at the temperature of the body, the nitrous oxide gives up no oxygen to the blood or the tissues. The gas becoming rapidly diffused and replacing the oxygen in the lungs and in the blood, black unoxygenized blood passes into the systemic arteries, and excites, through the vaso-motor nerves and center, contraction of the muscular arterioles. The resistance thus offered to the passage of unaerated blood through the terminal arteries explains the temporary fullness and tension of the radial pulse. The unoxygenized blood, passing through the systemic capillaries without the usual interchange of materials between it and the tissues, returns to the lungs in an abnormal condition, and there excites contraction of the pulmonary muscular arterioles. The resistance thus offered to the passage of blood through the lungs explains, on the one side, the systemic arterial emptiness, with feebleness or even complete disappearance of the pulse, and, on the other, the systemic venous fullness with lividity of the skin. The epileptiform condition is explained by the sudden and extreme diminution of the blood-supply to the brain, the blood at the same time being unaerated.

If the inhalation were continued, death would occur from the complete arrest of the pulmonary circulation and consequent over-distention of the right side of the heart; and this is the mode in which death occurs when an animal is killed by the continued inhalation of the gas. A year ago, my friend and colleague Mr. Hamilton Cartwright assisted me to kill two rabbits with the gas. In both animals, convulsions preceded death; and the chest being opened immediately after death, the heart was found still beating. The right cavities and the systemic veins were greatly distended with blood, while the left cavities and the aorta were comparatively empty and flaccid: the blood on both sides of the heart being equally black. The lungs were anæmic and collapsed to an extreme degree.

It will be seen that the phenomena observed during life and the appearances after death from the inhalation of the nitrous oxide gas are precisely similar to those which result from suspension of the respiration in the human being and in the lower animals.

It is evident, from the many thousands of cases in which the gas has been given, and from the extreme rarity of a fatal accident from its use, that, in the hands of a skilled and careful operator, no great risk attends the employment of the anæsthetic; but it is also obvious that, to a patient with a feeble fat heart, the distention of the right cavities which accompanies the disappearance of the radial pulse and the general lividity of the features must be attended with some degree of risk, and the danger must be increased when, the muscles of the trunk and limbs being convulsed, the pressure of the contracting muscles upon the veins drives the blood forcibly towards the right cavities of the heart, and so adds to their distention.—*Abstract of Lecture delivered at the Royal College of Physicians, London, by George Johnson, M.D., F.R.S.*

THE DIARRHŒA OF TEETHING.—From some interesting lectures on "Acute Diarrhœa," delivered by Dr. Thomson, Professor of Materia Medica and Therapeutics, University Medical College, New York, and published in the *New York Medical Record* (1876, Nos. 311 and 318), we transcribe some remarks of importance upon the diarrhœa of teething:

"I have often suffered from toothache myself, with the invariable result of finding that an aching tooth can seriously disturb the stomach. It is not the pain alone which takes away the appetite, furs the tongue, and brings on a qualmish dyspepsia; for the divisions of the trigeminus are allied through more than one branch with the gastric nerves, so that not only a frontal headache accompanies an irritated gastric mucous membrane, but, *vice versâ*, a painful tooth will often in adults check the flow from the follicles in the stomach. It would seem, therefore, that we may infer correctly that the reflex irritation produced by one or several teeth pushing their way through the narrow bony bed in the undeveloped jaw of infancy may be severe enough to suspend the gastric secretion almost completely. Should this occur, the milk will soon be vomited with a very sour smell; and, simultaneously with this symptom, you have plain evidence that something is producing pain and disturbance in the bowels. Irregularities of local temperature—the unfailing signs of radiated intestinal irritation—first manifest themselves: the feet and hands turn cold and contract: the head becomes hot and the face streaked; and soon the vomiting is succeeded by an evacuation which has the same kind of fermented odor that is perceptible in the matter ejected from the stomach. There are other characters besides the odor, such as the collections of undigested casein. But we would direct special attention to the sour smell, for this reason: Though the gastric acid is itself normally acid, nothing that it is mixed with should smell sour, this being a certain indication of fermentative change caused by the deficiency, and not by the excess, of the proper acid. On the other hand, the intestinal juice is alkaline, but still is as effectual a preventive of fermentation as is the gastric juice, so that sourness is equally an evidence of a great deficiency in the normal secretions of the bowels, and due to the same cause, namely, arrest, through reflex irritation, of the functions of the digestive glands. The way to treat such a diarrhœa will, therefore, differ in several respects from the treatment of almost any case of diarrhœa in adults. The first thing to do is to put a stop to the nerve-irritation; and for this purpose we may adopt several different procedures. One of the oldest and most familiar is scarification of the gums—an excellent measure if done when needed, and that is only when there is hyperæmia of the gums. If they are swollen and hot, a few drops of blood drawn by the prick of a lancet relieves them greatly, on the principle that local bloodletting is one of the most effective vascular and nervous sedatives that we know of. We are utterly without an explanation of this fact; but the child is quieted in just the same way that the dreadful spasmodic dyspnœa of a thoracic aneurism is sometimes marvelously quieted by the trivial bleeding from two or three leeches applied at the top of the sternum, or the pain of pericarditis by the same at the præcordium, or the irritable stomach in acute hepatitis by the same at the epigastrium, or the headache of meningitis by the same applied to the mastoid process. There is no support afforded by these clinical facts to the advocates of general bleeding, for the amount of blood taken in the case of aneurism, for instance, is too little to produce the slightest change in the sac or its contents. But the cases where lancing of the gums is called for are comparatively few. We should remember that the greatest aching usually accompanies the growing of the teeth through the bony canal, before they begin to encroach upon or irritate the gums at all; and hence, if the gums are neither red nor tumefied, you had better not attempt the operation, for it will be of little avail. The laity, and some physicians even, imagine that cutting the gums is for the purpose of making a way for the teeth to grow out; but a young gentleman, ambitious for a moustache, might as well prick holes in his lip to help the hairs appear, as the practitioner to think that a soft mucous membrane can really delay a growing tooth.

"We have, however, in the bromide of potassium, an agent which possesses an incontestable power of arresting reflex irritability. Its free administration lessens even normal movements, as in winking; and if you are annoyed with excessive excitability in the fauces of patients whom you wish to examine with the laryngoscope, you can generally soon obviate this by giving half a drachm of the bromide; while the more the reflex irritability is morbid in its degree, the more effective will this agent be found. It is not an anodyne in the usual sense of the term, for I doubt if it relieves pain at all; but it certainly can prevent, by its paralyzing effects on reflex processes, the toothache from disturbing travels to distant nerve-distributions. Whether this theory, however, be correct or not, I believe that I have found this drug exert a positive remedial action in the diarrhœa of dentition, given in five-grain doses every three hours or so. I need only mention also that it is of special use in those numerous cases where slight irritations are apt to induce infantile convulsions or spasmodic croup. Another effective agent for calming the nervous symptoms, and thus restoring the stomach and bowels, is cold to the head. I have found Potter's hydrostatic bag, filled with enough iced water to make a comfortable cushion for the child's head, act as nicely in checking restlessness and inducing sleep as the most approved medicinal prescription. Cold water applied to the head directly is objectionable for many reasons, so that if you cannot procure a water-tight receptacle, I would recommend your adjusting bottles of iced water about the head, which should first be protected by a thin napkin or handkerchief. When you take into consideration the great disproportionate development of the brain and nervous system in children, you will readily see the need there is for early attention to the deranged central circulation which is so apt to supervene in them, and which soon of itself must react upon the gastric and intestinal disorder. The paralyzing effect on reflex action of immersion in lukewarm water is doubtless also the explanation of the benefits found from the use of the warm bath in these cases."

Prof. Thomson adds, however, that the primary object should be to get rid of the food, which, by fermenting in the alimentary canal, not only acts as a local irritant, but prevents the digestion of any matters subsequently taken, by inducing also fermentation in them. All real nutrition for the time ceases, and the child is in much the same condition, and has the same appearance, as if it had not been fed at all.

"I have never, therefore, seen cause to regret my beginning the treatment of such cases with the nursery remedy of castor oil; though I have seen cause to regret not doing so from a mistaken confidence in the previous purging having dispersed sufficiently the offending matters. We are apt to be too much influenced by the activity of the diarrhœa towards stopping the flux at once, lest it exhaust the patient. But it is scarcely possible to irritate the patient's bowels with the oil, however given, in comparison with the irritation which fermented cheese is capable of producing; and so often will the whole trouble promptly subside after a single good operation by this medicine, that I am inclined to recommend your beginning the treatment of infantile diarrhœa with it very much as a routine prescription. After it has acted, you may rely on your other measures with much more confidence than you have reason to entertain without it. Another indication, present from first to last in the course of the complaint, is to supply the deficiency of the gastric juice by artificial substances. You cannot do any harm by pepsin and a few drops of muriatic acid,but you may be doing therewith just what is needed to prevent a repetition in the abnormal change in the food; and when there is much gastric irritability, the addition of bismuth to pepsin is indicated. . . . The derangement of the digestive process of course demands also for a time that the stomach be allowed to do less work. The heat of the mouth and fauces (especially after vomiting) increases thirst so much that the child is likely to be nursed or fed too often. Drinks of cold barley- or rice-water in spoonful doses, or equal parts of milk and lime-water, are therefore very properly recommended, for the reason that, with no real appetite, the patient should be relieved with drinks that will tax the stomach the least; otherwise your best prescriptions may wholly fail. Should you find, say on the second day after beginning with these measures, that the diarrhœa continues, and that the discharges are more frequent or watery, I would then begin with a combination of familiar correctives, which I have found best administered in Dr. West's rhubarb mixture. . . . The superiority of the rhubarb mixture (as compared with the usual mixtures containing sulphuric acid and laudanum, chalk mixture, ipecacuanha, or astringents) appeared to me so certainly demonstrated that it has influenced me in treating summer diarrhœa in young and old ever since. West's prescription is this:—Magnes. sulph. ʒj, tinct. rhei ʒij, syr. zingib. ʒj, aq. menthæ ʒix; one drachm three times a day for children a year old. You will notice that there is no opiate in this mixture; and you should bear this in mind, for if you can check a diarrhœa of this kind without this drug, by all means do so. Instead of thinking of opium first, think of it last, when the bowel-trouble has mal-digestion as its beginning, because opium is invariably a hindrance in children to the proper secretion of digestive juices. The indication of opium arises only when the discharges not only continue profuse, but are also evacuated with a suddenness which betokens excessive peristaltic action. In such a case, the addition of a drop of laudanum to each dose of the mixture will generally suffice, for I prefer to give the sedative only in this combination, as the one least calculated to neutralize its interference with the digestive secretions."—*Medical Times and Gazette.*

Cases of Salivary Concretions.—At the meeting of the Aberdeen, Banff, and Kincardine Branch, February 3d, 1877, Dr. Reid, of Aberdeen, contributed a paper on this subject. Most practitioners had frequently met with patients complaining of the annoyance caused by small hard projections inside the upper and under lips, which, when cut down on, appeared to be small hard concretions about the size sometimes of a hemp-seed. They were deposits of the inorganic matter of the secretion of the labial glands blocking up the ducts. The concretions, however, which he had to notice more particularly were the concretions affecting the larger salivary apparatus. As he had not seen any cases of affection of the sublingual, he would confine himself to those affecting the submaxillary gland, where the secretion had a very much longer passage to traverse, and where there was but one outlet, viz., Wharton's duct. Before, however, considering submaxillary concretions, he wished to refer to the subject of ranula. Some authorities held that ranula had its origin in the obstruction of the submaxillary duct and in the subsequent accumulation and coagulation of the secretion from the gland and dilatation of the duct, while others considered that there was no proof of dilatation of the duct, and that it was difficult to understand how so small a duct could be dilated to so large a size. Whatever was the cause of ranula, the cases he had to bring forward would show that Wharton's duct was capable of very great dilatation, sufficient, he believed, to account for the largest ranula. Case I.—A healthy woman, upwards of fifty years of age, had a large tumor extending from near the frænum linguæ to the submaxillary gland, increasing very rapidly in size, and greatly obstructing swallowing. A small incision was made at the thinnest part, and, on inserting a blunt probe, it was felt to grate on some hard substance. The opening being enlarged, thick fluid escaped, and a grayish-white friable mass, about the size of the kernel of an average sized hazel-nut, was extracted. The relief afforded by the operation was almost immediate, and there was no return of the tumor. Case II.—A man between thirty and forty years of age, otherwise in good health, had been troubled for several months with pain and swelling in the region of the submaxillary gland. But little swelling was perceptible between the gland and the outlet of the duct, although there was swelling in the gland itself. Liniments, poultices, warm water kept in the mouth, etc., were resorted to without any relief, and the pain and stiffening of the jaw became increased, so that swallowing was scarcely possible. A swelling beneath the tongue began to appear at this time; and, in the course of two or three days from the first appearance of this swelling, the duct being much distended, a whitish speck was seen in the sublingual caruncula; and, on an opening being made, a concretion about the size of a pea was easily scooped out. The operation relieved the pain entirely, but the swelling did not altogether subside; and a relapse took place in about a year. The concretion in this case, though small, was large enough to close up the duct and obstruct the passage of the secretion, and caused a swelling like a half-developed ranula. Had the tumor been opened at the thinnest part, the concretion would most likely have escaped observation. The case seemed to indicate that the mere size of the concretion did not determine the extent of the dilatation of the duct, but that it acted, whether large or small, as an obstruction, and might cause enlargement to any extent almost. The calculi in both the cases consisted of phosphate of lime with a little organic matter. Dr. Reid had brought these cases before the Branch on account of the analogy which seemed to him to exist between the formation of these concretions in the glands, their escape, and their slow and painful passage along the ducts, and the urinary deposits in the pelvis of the kidney, their escape, and passage along the ureters. Dr. Ogilvie Will exhibited some specimens of salivary concretions. He believed that ranula was not from dilatation of the duct, but from an obstructed follicle; and he had been able to pass a probe along the duct, leaving the ranula untouched. He had no doubt as to the salivary concretions mentioned by Dr. Reid. These were certainly in the duct. Dr. Alexander Ogston had seen several cases of apparent phlegmon under the chin suddenly disappearing in a few days, and he thought that these might very likely have been salivary concretions. He had known grains of corn enter Wharton's duct, and there cause inflammation. He believed that ranula was Wharton's duct obstructed, and had cured that disease by cutting out a piece of the duct in his cases. —*British Medical Journal.*

TOOTHACHE OF PREGNANCY.—At the meeting of the Aberdeen, Banff, and Kincardine Branch, March 7th, Mr. De Lessert read a paper on the "Toothache of Pregnancy." The subject was not without interest to the medical or dental practitioner, as both were frequently called on to treat such cases; and works on obstetrics and dental surgery were generally silent on its causes, symptoms, or cure. He believed the "toothache of pregnancy" to be of two kinds: the one a purely neuralgic condition affecting previously healthy teeth, the other accompanied by disease of the hard structure of the teeth. Dr. Tyler Smith, in his "Manual of Obstetrics," had said, after stating the frequency of neuralgic toothache from reflex uterine irritation under such circumstances, "In many subjects, acute caries of the teeth occurs, and in some child-bearing women a tooth or two is lost in each pregnancy." The author, however, thought that, if the cause were only reflex uterine irritation, it would be singular, as reflex irritation might be produced in the dental branches from other causes, and yet no attempt had been made to attribute dental caries in previously healthy teeth to such causes. Mr. Salter, in his work on "Dental Pathology and Surgery," considered that there was evidence that maladies, especially those deranging the digestion and primary assimilation, were potent immediate causes of tooth-decay, and this especially during pregnancy. Mr. Salter had defined this disease as a softening and disintegration of the tooth's surface generally, penetrating gradually towards its center. Mr. De Lessert then quoted Mr. Oakley Coles, who described the enamel as having either disappeared or become so softened in texture as to allow of a sharp excavator easily passing through it, the teeth being often very sensitive and conscious of every thermal change. Sometimes a general softening occurred, without any actual decay, the tooth becoming very sensitive, loosened from its socket, and a source of so much irritation that, even within a few weeks of accouchement, extraction was required. On removing the tooth, the periosteum was found scanty and anæmic, the tooth could be cut through without difficulty, and, on examining the pulp, it could be seen to be in a fatty condition, unmistakably distinguishable from the ordinary healthy or inflamed pulp, the cut portion of the tooth having a soft, greasy surface, and presenting such an appearance as might be called "fatty degeneration." Mr. De Lessert said he had endeavored to show that the toothache of pregnancy was of two kinds: the one neuralgic, and the other, without being actual caries, producing a condition ultimately in many cases rendering extraction the only means of removing the irritation. He considered this second condition to be frequently the result of the state of the dental nerves during pregnancy, for these might be irritated in a variety of ways, as from the altered condition of the blood in the pregnant state, or from the acidity of the stomach, or the constipation of the bowels common under such circumstances. As regarded treatment, he believed that frequently the dentist was not informed that the patient was pregnant, when she applied in the early months, and later on the patient was usually sent by her medical attendant to have the tooth extracted, so that the dentist had no option as to treatment. It had been objected to extraction, during pregnancy, that such a course was likely to cause shock; but although this risk was popularly believed to be so great that women had had the operation performed in the hope of procuring abortion, it was very probably much exaggerated. Although extraction was often the only remedy, yet in other cases the general health had rather to be improved and the nervous tone to be strengthened. There were two modes by which the object of the practitioner might be accomplished: one by relieving the present suffering as much as possible, and waiting for the termination of the pregnancy; the other by attempting to cure the general disease on which the tooth-affection seemed to depend. Caries once established or pulp exposed, the dentist had to take the local treatment in hand; and carbolic acid or morphia would be found useful, to be followed as soon as possible by permanently filling the cavity with gold or amalgam. Alkalies, such as carbonate of soda, were useful in acid oral secretions. Dr. Jackson asked if Mr. De Lessert had actually seen those softened teeth of which he had spoken. Dr. Williamson thought that the toothache of pregnancy was due to ordinary caries occurring under unfavorable circumstances. Dr. Richardson had referred the toothache of pregnancy to hysteria, and had found it alleviated by a narcotic, such as chloroform. As regards treatment, Dr. Williamson thought carbolic acid, or destruction of the pulp with arsenic, would be effectual. He saw no reason why extraction should not be had recourse to, if necessary. Dr. Stephenson asked if any of the members had ever seen a case of abortion produced by extraction of a tooth. Dr. Williamson had seen a case where a sort of fit had been produced. Dr. A. Ogston had never seen any bad results from extraction of teeth during pregnancy. As regarded disease of teeth in pregnancy, he had dissected pregnant women and found the tissues peculiar. The fatty tissues appeared white and succulent, and, in fact, in a state of inflammation. The kidneys also were in a similar state. One could easily understand that the pulps of the teeth might be similarly affected. His impression was that pregnancy would tend to produce caries in a previously healthy tooth. Mr. De Lessert had never seen such cases as those referred to by Dr. Jackson. In regard to Dr. Williamson's remark that there was no disease but caries, he held that there was fatty alteration of the pulp, and that this caused the pain. He had never seen extraction cause abortion.—*British Medical Journal.*

THE DISCRIMINATION AND TREATMENT OF NEURALGIA.—I have for several years used a simple and ready method of discovering whether stimulants and tonics, or whether alkalies and aperients, would be more likely to cure any given case of facial or dental neuralgia. The patient is first directed to hold warm water in his mouth, or to otherwise apply warmth to the seat of pain; and if little or no relief is thus gained, but especially if, as often happens, the pain is actually intensified, then to employ cold water in a similar way. If the cold water relieve the pain, this is regarded as being chiefly due to impurity of blood; and I have always found that it is relieved with certainty by magnesia and dieting. If, on the contrary, warmth relieve the pain very distinctly, then tonics, varying as the locality (district), constitution of patient, and precise causation, are surely indicated, and will, if in sufficient doses and combined (when necessary) with sedatives, remove—for a time at least, but often altogether—the insufferable pain. Many cases have occurred in which patients at first resolutely bent upon having one or more teeth extracted, have been enabled to retain them for years simply by putting in practice this test and its associated treatment. There are some cases of neuralgia in overworked persons in which both plans of treatment are required. A man catches cold and has hemicrania. He is better out of doors; but, upon entering a warm room, is shortly in unendurable pain, especially about one eye, which becomes congested and tear-streaming. A single large dose of magnesian aperient, followed by ten- or fifteen-grain doses of ammonium chloride in infusion of bark, will remove this condition. Again, the same patient may at one time require the magnesia plan and at another time the tonic and stimulant plan for pain in the self-same nerve, this difference being shown and the proper method suggested by the altered effect of cold and heat; and it is probably the want of recognition of this fact which produces the apparent fickleness and uncertainty of any particular drug, such as phosphorus, guarana, quinine, etc., in this disorder.—*T. Churton, M.B., in British Medical Journal.*

THE FLUIDS OF THE MOUTH IN SICKNESS.—Dr. Hodson wisely calls attention in the *Medical Record* to the fact that, in any illness involving a feverish condition, the fluids of the mouth are constantly as intensely acid as respects the teeth as in any medicine administered by the physician, and, moreover, from the high temperature of the buccal cavity at such times, the power of these acids for evil is greatly augmented. Further, a direct consequence of these conditions is the especially rapid fermentation and decomposition of all food lodged between and around the teeth, and the consequent elimination of other deleterious acids. Dr. Hodson recommends rinsing the mouth with liquor calcis (lime-water), diluted according to the sensitiveness of the mucous membrane, and flavored with a few drops of wintergreen or peppermint to make it agreeable.—*Scientific American.*

Alveolar Hemorrhage.—Mr. Hamilton Cartwright read notes of a remarkable case of alveolar hemorrhage occurring in a patient the subject of jaundice. A loose stump was removed from the gum, when uncontrollable bleeding ensued, not only from the wound, but from the whole surface of the mucous membrane. The case was considered hopeless; whilst it also transpired that the patient, though a healthy man before he became the subject of icterus, had, subsequently to that period, had hemorrhage not only from the gums, but also from other parts. When he saw the patient, after two days' bleeding, hemorrhage was taking place from the whole surface of the gum, and the patient was much exhausted. Perchloride of iron had been extensively used; and, although it had checked the bleeding on the first application, it utterly failed to arrest it afterwards. With the consent of the gentlemen attending the patient, Mr. Cartwright took a model of his mouth, and made a gutta-percha compress accurately adapted to the teeth of each jaw, into each side of which strips of lint were placed over some solid perchloride of iron, the use of which was suggested by Sir James Paget; whilst space was left for the administration of food, thereby avoiding the necessity of giving it *per rectum.* Opium was also given freely. Bleeding was thus arrested for nearly twenty hours, but subsequently recurred, when the compress was reapplied with the result of arresting the hemorrhage. The attention of the society was drawn to the not unfrequent occurrence of epistaxis in jaundiced patients; and the members were asked to give their experience of the effects of other constitutional lesions in inducing a hemorrhagic tendency. The use of the liquid perchloride was reprobated, on account of the sloughing it caused if primarily unsuccessful, thereby creating a larger surface from which bleeding could ensue. Mr. H. Cartwright extolled the use of opium in such cases, though, as a rule, internal remedies were not of much avail. In the present case, he believed that the attention paid to the patient by his medical attendant, the careful adjustment of the compress, and the means adopted of feeding the patient, in combination with the opium, saved his life. In cases of this kind, those around the patient would frequently misjudge the amount of hemorrhage taking place. It was, of course, a matter of great importance not to remove the compresses frequently in obedience to other fears, and he thought that a good criterion of the amount of blood swallowed was the frequency of swallowing, as proved by the movements of the larynx.—*Proceedings of Association of Surgeons practicing Dental Surgery, in British Medical Journal.*

The Use of the Chisel in Operations on the Maxillary Bones.—The surgical use of the chisel seems to be gaining ground speedily, a goodly number of cases proving its utility in operations on long bones having already been recorded in the *British Medical Journal* and other periodicals; and, from the success following its employment in suitable cases, there seems to be every reason to expect that a wide field exists where this implement will be found useful. So far as I have myself seen, attention has not yet been directed to the advantages which may be gained by substituting the chisel for the cutting forceps in cases requiring the removal of small portions of the maxillary bones; and, as I have lately used it with good effect in two cases of operation for the cure of epulis, a short notice may prove of use to those who may be called upon to deal with similar cases.

In the first case—a private one—the tumor, which was about the size of a small hazel-nut, was attached to the inferior maxilla, its upper margin slightly overlapping the left central and lateral incisor and canine teeth. The left central and canine teeth having been extracted, two vertical cuts were made, one on each side, with a small stiff-backed saw, and the included portion of bone from which the tumor sprang was readily removed by applying a chisel transversely, and giving it one or two sharp taps with a mallet. The cut surface was smooth and regular, the healing process rapid; and a few months afterwards the patient was supplied with false teeth by my friend, Dr. W. H. Williamson, who informed me that the cleanness of the cut aided him considerably in remedying the defect for the relief of which the patient applied to him.

The second case—a hospital one—was one of epulis of the upper jaw. The tumor, which somewhat resembled a plum-stone in size and shape, was attached to the alveolus immediately above the central incisors. Here the proceeding just mentioned was adopted, and with equally satisfactory results. In neither case were the teeth diseased.

The advantages of the chisel over the cutting forceps in cases of the kind spoken of are the following, viz.: it can be applied with greater accuracy, the resulting surface is much more even, and therefore it is better suited for the insertion of false teeth, and the danger of fracturing adjacent parts is completely obviated. These reasons are, I think, sufficient to induce surgeons to give this instrument the preference.—*J. C. Ogilvie Will, M.D., in British Medical Journal.*

ON SOME UNTOWARD RESULTS OF IMMEDIATE TORSION OF THE TEETH.—Mr. Coleman read a communication upon this subject. Alluding to the supposed value of this operation in certain cases of dental irregularity, he showed how unsatisfactory the results might be when performed on imperfectly developed teeth. In certain cases development was entirely arrested, or absorption took place, and the tooth never descended to a level with its fellows, or even receded beyond the dental line, as occurred in a case the model of which he showed to the members present. These results he ascribed to the severance of the pulp-vessels by the operation. Messrs. Cattlin, Edgelow, Stevenson, Gregson, and S. Cartwright joined in the discussion, there being a division of opinion as to the merits of the operation, though it was generally maintained that the operation was not justifiable before thirteen or fourteen years of age.

IRRITATION OF THE DENTAL BRANCHES OF THE FIFTH NERVE.—Mr. S. J. A. Salter read a paper "On some Reflex Symptoms and Results of Irritation of the Dental Branches of the Fifth Nerve," and exhibited a series of specimens of dental and alveolar necrosis and exfoliation following the eruptive fevers—scarlet fever, measles, and smallpox. He said that a few isolated specimens of this condition, preserved in our hospital museums, had been attributed to mercury, but that that explanation was refuted by modern evidence. Mr. Salter considered that they are among the specific sequelæ of the eruptive fevers; that the pulps and caps of the forming permanent teeth (members of the tegumentary system) are poisoned by the disease, die, and are shed in the only way in which they can be cast off—namely, by the necrosis and exfoliation of the capsule of bone which encases them, and to which the bone-necrosis is almost always strictly limited. Mr. Salter remarked that these cases usually occur in children about five years of age (a year or two more or less), when dental development is in its highest activity; that the morbid condition is usually symmetrical on both sides of the jaw; that the bone-necrosis is limited to the alveolar processes and capsules surrounding the teeth; that he has never seen this condition excepting after eruptive fevers; and that he has had under his own care about eighteen cases after scarlet fever, eight after measles, and four after smallpox.

Mr. T. W. Nunn read a paper on the same subject, in which he gave an account of certain cases confirmatory of the statements made by the president, Mr. Cartwright, in his communication "On Teething and its Complications" made to the society on November 22d. The first case, which gave the keynote, as it were, to his subject, was a remarkable instance of delayed dentition in a woman between thirty and forty years of age, giving rise, by reflex irritation, to ulcer of the cornea. The ulcer, which obstinately resisted treatment, healed directly an upper bicuspid was cut. The president gave several examples which had come under his notice of reflex action connected with the teeth, as also with other portions of the body, notably a remarkable case of double squint dependent upon curvature of the spine. Mr. Salter mentioned a case in which the iris had changed color as a result of dental lesion. Dr. Wiltshire ascribed ulceration of the cornea to the action of reflex nervous irritation on nutrition. Mr. Stevenson had seen good resulting from lancing the gums in cases of reflex disturbance.

Mr. Hamilton Cartwright showed a patient aged thirty, who had suffered from neuralgia for many years, her case presenting some peculiar points of interest. The trigeminal nerve was chiefly involved, acute pain being experienced in the ear, eye, and supra-parietal region, whilst unilateral hyperæsthesia existed over the entire left side of the body from the head to the knee.—*Proceedings of Association of Surgeons practicing Dental Surgery, in The Lancet.*

Evil Results from Covering the Palate with Artificial Denture.—When I was traveling on the continent last September I lost two of my front teeth, and afterwards another; besides this, one of my back teeth was so tender that I could not masticate with that side of my mouth. This tooth, on my return to London, my dentist, whom I have employed for twenty years, told me would be of no further use to me, and it was extracted.

I now determined to go to any expense, that for the remainder of my days my mouth and teeth might be in proper order (the upper jaw only being affected). For a month I gave the gums time to harden, then a cast of the upper part of the mouth was taken, and four days before Christmas, everything being in readiness, the new arrangement was placed *in situ*, a perfect fit, quite comfortable. I felt proud of my appearance, and could bite the hardest substance with every tooth in my head; but to effect this there was a gold plate covering the whole of the *roof of the mouth.* I remonstrated against this, and was told that it was of no consequence, that the tongue was the organ of taste, and that it would not interfere with the process of digestion. Now what happened? I masticated perfectly, the saliva mixed with the food, and then went down my throat as though it had passed through a tin funnel. For a few days I felt no evil consequences; but in about a week or ten days I began to get out of order—griping, etc. First the gastric juice went wrong; then there was one day too great a supply of bile, another day too little, and at last none at all—in fact, congestion of the liver. Knowing that nothing will attack this except blue-pill, although I never take medicine, I went home one Sunday evening at seven with a pure blue-pill, and slept soundly for sixteen hours, and after this a mild aperient. The action of the liver and the bile was restored; but still I had no appetite. I tried to tempt it with a good dinner, but turned away from everything, and I have gone four days and a half without food or drink, except perhaps water.

Having thirty years ago attended lectures in Edinburgh on physiology, including the subject of digestion and dietetics, it now suddenly occurred to me that in covering up what my dentist called the roof of my mouth he had, in fact, covered up my palate, and I went to him one day at eleven, and then and there insisted that a large piece should be cut out of the plate, leaving what remained in the form of a horseshoe, with quite as firm a bearing as before, and freedom of contact between the tongue and the palate. Two hours afterwards I enjoyed my lunch, as I have every meal since; and although after such disorganization time and attention are necessary, yet every meal I now take is adding to the tone of the stomach and system. For what happens now? I masticate perfectly, the saliva mixes, the food is driven by the tongue in contact with the palate, taste is gratified, and the palate, which stands as the sentinel of the throat, when the food has been so far prepared, by means of the gastric nerve sends a telegram down into the stomach to intimate what is coming.

I have no complaint to make against my dentist, for mechanically he has done his work perfectly, and has only followed the practice of his profession; but I wish to bring the subject before you physiologically, for thousands upon thousands have gone to their medical men, complaining of ill-health, and he works in the dark, because they do not tell him what they do not know themselves—namely, what they have got in their mouths, and thousands upon thousands have met their deaths from this cause.

I may mention, in corroboration of what is here offered for your consideration, that three gentlemen and my landlord have shown me their artificial arrangements, and in all cases the palate is covered, perhaps to a smaller extent than in my case, but in no case with the back part of the palate cut out in the way I have insisted upon; and a gentleman, having heard my story, went home, and begged to see what was fitted to his wife's mouth by one of our most eminent dentists. There the whole of the palate was covered up, and she says that she has been out of health ever since.—*William Stirling Lacon, in The Lancet.*

Necrosis of the Lower Jaw.—Fistula in the cheek is sometimes a very troublesome sequel to disease or injury of the jaw, and is not only often difficult to heal without operation or the local application of caustics, such as the actual cautery, but is extremely obstinate, a very long time being often necessary to effect a permanent cure. The following case, as will be seen, was treated in a very simple manner, and completely healed in a short time.

A man presented himself in the out-patient room with a fistulous opening in his face just opposite to the lower canine tooth of the left side, through which the saliva flowed, and whenever the lower lip was moved the saliva passed out in jets. It appears that a few years previously he had experienced some clumsy dentistry, and had as a result necrosis of the lower jaw, with an abscess afterwards, which opened through the face. On passing a probe up the sinus, which had the calibre of a crow-quill, it took an oblique course, nearly an inch in length, upwards and backwards. Mr. Bellamy adopted the simple expedient of introducing a small crystal of nitrate of silver into the sinus, and leaving it there, as he has been in the habit of doing with troublesome penile fistulæ. At first the nitrate caused a considerable amount of discomfort and pain, but after two further applications of the salt, at intervals of a week, the canal healed completely, and a small depression was all that could be seen indicating the original position.—*Charing-Cross Hospital Reports, in The Lancet.*

Spasms and Cramps in the Abdomen, from Defective Mastication.—These symptoms are of very frequent occurrence in females, and are generally treated by anti-spasmodics, tonics, and aperients. In the majority of instances, defective masticatory power, from decay or absence of the molar teeth, will be found to exist, and constitutes the *fons et origo mali.* Until this defect be remedied, medicine is powerless to prevent a recurrence of the symptoms. Defective mastication is responsible for far more suffering in women than is generally supposed. Sick headaches, neuralgia, dyspepsia, flatulence, diarrhœa, dysmenorrhœa, and many other symptoms, are often traceable to this cause. The insertion of a few artificial teeth will accomplish more than the most elaborate combination of the Pharmacopœia.—*Clinic of Dr. Edis, at Middlesex Hospital, in British Medical Journal.*

The Dental Reform Movement in England.—A fearful storm rages in dental circles, and hard names are of frequent occurrence. How this storm originated it is not very easy to say, but it is easy to see the extent to which it now prevails, though not, we fear, the depth of the animosities it has raised. One body—the Association of Surgeons practicing Dental Surgery—has petitioned the Council of the Royal College of Surgeons to the effect that no schedule shall be received by the college except it be signed by one having some registrable surgical qualification, such as that of Member or Fellow of the College of Surgeons; and this recommendation has received the sanction of the Dental Board. This is intended, we suppose, to compel all teachers of dental anatomy, physiology, or surgery to be or to become qualified to practice medicine and surgery. The intention of the memorial is evident: the association desire to raise the standard of dental surgeons generally by insisting on or encouraging the taking of a proper medical qualification, and they begin at the top of the tree. In this we think they are hardly wise. Many men may be led who will not be driven; and we think it probable that if the association had kept on the even tenor of its way its ends and aims might have been more speedily accomplished.

But when we turn to what might perhaps be termed the opposite camp we find even more to condemn. In the view of these gentlemen the dental diploma of the Royal College of Surgeons of England is the be-all and end-all of dentists. Without possessing that qualification no one is to be allowed to call himself "Dental Surgeon, Surgeon-Dentist, or Dental Practitioner, or Dentist," under a penalty; and qualified dental practitioners are to be alone capable of recovering fees for dental operations. We have ever been far from intruding upon the province of dental surgeons, nor do we now desire to do so, were we not compelled to stand up for the rights of medical practitioners. Matters have surely come to a pretty pass when duly qualified surgeons are to be deprived of their rights, secured to them by Act of Parliament,—and certainly these rights are scanty enough already,—at the bidding of a body of dentists. What dental operation is there which a duly qualified surgeon may not legally undertake? There are many points relating to manipulation, to the making and fitting of artificial teeth, which no ordinary surgeon would care to claim as within his special province, for the study and practice of the art would not repay him; but is he therefore, provided he care to devote himself to the pursuit of these things, to be precluded from doing so unless he take a certain qualification, granted only in London under certain special conditions, whether the surgeon belong to England, Scotland, or Ireland? This does not hold with reason.

There can be no doubt that the dental profession, or business, or trade is sadly in need of reform, but the reform seems to be beginning, or trying to begin, at the wrong end. In the mean time, any one, however ignorant, may call himself dentist or surgeon-dentist,—the two words often carefully separated by an intervening word,—and may with impunity practice anything he likes. A man who has served in a workshop preparing artificial teeth may set up in this way, and might, compared with some, be even called well qualified to practice the art. But it is time that such men should be separated from gentlemen of the highest professional and scientific eminence, who, we are glad to think, are to be found in the ranks of the dental profession. It would be far better were the squabbles among dentists to cease as regards the upper ranks, and every effort be made to improve the lower class of dental surgeons. From our point of view, however, we cannot look upon the L.D.S. as the be-all and end-all of a dentist's education. It is true that to acquire it a somewhat complex curriculum has to be undertaken,—a curriculum which does not differ very greatly from that required for the membership of the College of Surgeons,—but there is this vast difference, that in the case of the membership the examinations are much more extensive and more strict than they are as regards the dental diploma. Hence it is that too often dental students lounge through the classes at their medical school utterly indifferent to what is going on, idle themselves, and a source of idleness in others. We are happy to say that to this rule there are many noble exceptions, but we fear the rule is on the side of idleness. We hold it better, therefore, in all cases where there is no material obstacle, that the student should proceed to qualify himself for registration on the medical register, whilst also qualifying himself for the work of dentistry, than to slip into a by-path with only the smattering of a medical education. But it is plain that all men cannot do so: the time and the money are wanting to many; and for these we certainly recommend the dental diploma by itself. But the dental diploma cannot be, and will not be, held to be superior to a diploma in surgery or medicine. Skill and knowledge do not depend on diplomas either in dentistry or anything else. In cities and large towns it is all very well to do as one dental gentleman suggested at a meeting of dentists—send all dental cases to a dentist; but in the country the general practitioner has most frequently to do everything himself, and it would certainly be hard if he were to be deprived of the right of recovering fees for any dental operation.

In as far as dentists are seeking to regulate and improve the internal condition of their own body, they have our hearty sympathy. Their mode of procedure may be injudicious, and we certainly think it foolish that the best qualified men in the dental profession should be arrayed in two camps; but their aim is to do good. When, however, they come to interfere with the rights and privileges of our body, that is a different story,—*Gare qui touche*,—they run the risk of upsetting their whole scheme. To certain parts of it, indeed, we cannot help objecting. They seek to create a register of dental practitioners, and they want that appended to the medical register. We trust the Medical Council will consent to no such proposal. There are quite enough qualifications already, and the addition of another to find refuge between the boards of the medical register is not desirable. If there is to be a dental register, let it be a register of dentists,—men practicing dental surgery.—*Medical Times and Gazette.*

UNQUALIFIED DENTISTS IN FRANCE.—In a petition, addressed to the Chambre des Députés, Dr. Andrieu, surgeon-dentist attached to the Paris hospitals, prays for the enactment of a law prohibiting any one in future from practicing as a dentist if unprovided with the diploma of doctor, or at least of *officier de santé.* He also asks for the creation in the Paris Faculty of a special chair for "Diseases of the Mouth." In the petition he demonstrates that the dental art requires just as much study as any other branch of surgery or medicine, which can only be acquired in the dissecting-room and hospitals, while the possession of a knowledge of it can only be tested by examination. He instances several fatal accidents which have occurred in consequence of the ignorance or want of skill of impudent dentists, and quotes the opinions of celebrated practitioners in favor of legislation. The committee to whom it was referred paid great attention to the reading of the petition, and, agreeing in its principle, recommended that it, as well as M. Andrieu's *projet de loi* (which, it seems, it is customary for French petitioners to present), should be forwarded to the Ministers of the Interior and Public Instruction.—*L' Union Méd.*

POPULAR INSTRUCTION IN THE CARE OF THE TEETH.—The Medical Committee of the National Dental Hospital, London, have issued the following card of directions regarding the care of the teeth:

I. The teeth should be cleaned at least once a day, the best time being at night—last thing. For this purpose use a soft tooth-brush, on which take a little soap, and then some precipitated chalk, brushing up, down, and across. There is rarely any objection to the friction causing the gums to bleed slightly.

II. Avoid all rough usage of the teeth, such as cracking nuts, biting thread, etc., as by so doing even good sound teeth may be injured.

III. When decay is first observed, advice should at once be sought. It is the "stopping" in a small hole that is of the greatest service; though not unfrequently a large filling preserves the tooth for years.

IV. It is of the greatest importance that children from four years of age and upward should have their teeth frequently examined by a dental surgeon, to see that the first set, particularly the back teeth, are not decaying too early; and to have the opportunity of timely treatment for the regulation and preservation of the second set.

V. Children should be taught to *rinse* the mouth night and morning, and to begin the use of the tooth-brush early.

VI. With regard to the food of children, to those who are old enough, "whole-meal" bread, porridge and milk should be given. This is a much more wholesome and substantial food than white bread.

VII. If the foregoing instructions were carried out, comparatively few teeth would have to be extracted.

VIII. Those who do not seek nor receive hospital aid, are recommended to consult qualified practitioners, and not persons who advertise by show-cases, puffing advertisements, etc.—*Monthly Review of Dental Surgery.*

CHINESE DENTISTRY.—[The subjoined paper is the joint production of J. G. Kerr, M.D., and G. O. Rogers, D.D.S., embodying the observations of both gentlemen as taken on the spot, drawn up first by Dr. Kerr and then interspersed with observations as to details from Dr. Rogers's own pen.—ED. *China Review.*]

The practice of dentistry in China is doubtless very ancient, but it has not attained to the perfection which characterizes the modern art as practiced in the West. It is, however, supposed that the Chinese operator is possessed of superior skill in certain points to which his Western brother has not been able to attain.

Inspired with zeal for an increase of knowledge, and desiring to perfect ourselves in the art of relieving human suffering and repairing the defects of human teeth, we proceeded on the 9th of March, 1876, to the Temple of Horrors (Shing Wong Miu), in Canton, where Chinese dentists do congregate. We had in our minds three points which we wished to investigate,—

1. The cure of toothache by taking out worms.
2. Painless extraction of teeth.
3. Insertion of artificial teeth.

I. It is well known that the Chinese attribute toothache to the gnawing of worms, and that their dentists take these worms from decayed teeth. Western physicians are disposed to believe that there is a little jugglery about it, having never been able to detect worms in the cavities of teeth. But how the dentists performed the trick (if it was one) and so artfully concealed it in the hurry of daily business was a secret, and to discover this was one object on which we on this occasion had our purpose fixed. We met with a rather intelligent-looking member of the profession, from whom we obtained a lot of artificial teeth, and Dr. R. desired to obtain a complete kit of the tools used. In order to avoid the crowd we invited him to a restaurant, where, over a social cup of tea, the matter was, with some difficulty, arranged. On the following morning the man made his appearance with the coveted implements, bringing also a lot of the worms, and proceeded to instruct us how to use them. His instructions or explanations were in full accord, as far as we were able to see, with our personal observations, as we remained for a considerable time to examine and study their practical operations, several patients being treated in our presence. When a patient with toothache applies for relief, if the tooth is solid in the socket, the gum is separated from the tooth with sharp instruments and made to bleed. During this operation the cheek is held to one side by a bamboo spatula, both ends of which are alike, and on the end in the hand some worms are concealed under thin paper pasted to the spatula, the paper being the same color as the spatula. When all is prepared this end is adroitly turned and put into the mouth, and the paper, becoming moistened, is easily torn with the sharp instrument used for cutting the gums, gives up its worms, which mix with the bloody saliva, and the dentist leisurely picks them out with a pair of forceps. The patient having ocular demonstration that the cause of his disease has been removed, has good reason to expect relief, which, in most cases, would be the result from the bleeding of the gum and the fright of the patient.

When the toothache returns, as it will in almost every case,—perhaps within an hour, or maybe not for one or two days,—the patient again seeks his dentist for relief, and the same operation is performed, finding more worms, which of course explains the recurring trouble, and this is continued from time to time until the tooth ceases aching altogether of its own accord from the natural death of the pulp. These worms are manufactured in quantities to suit the trade, and they are very cleverly done; yet, to fully carry out the delusion, the dentist is obliged to keep on hand a few live worms to show his patients, explaining that most of the worms taken from the tooth are killed, either by a powder they often apply to the tooth (it may be said that there is no virtue in the powder used) or by the process of taking them from the tooth with the forceps. Another fact might be mentioned: the standard medical books of China teach, and have taught for ages, the idea of worms in a tooth causing it to ache. The above practice is resorted to when the tooth is firmly set in the jaw, or is not so loose as to be removed with the fingers or by a slight force or pressure with iron instruments, which will be shortly described. This, our friend informed us, was an imposition, for he assured us that they could not extract teeth that were solid in the jaw.

II. The painless extraction of teeth is accomplished by the application of a powder to the gum, which is said to loosen the tooth so that it can be removed after a little time with the thumb and forefinger. The powder is useless and applied only to deceive the patient. This corresponds to what we had long known, viz., that, unless a tooth has already become very loose, the Chinese have no means of removing it. They do use a pair of forceps with flat jaws, but they must conceal them in a cloth, because the patients are taught that no instruments are used in removing a tooth, and they are of no use unless the tooth has already become quite loose. Our friend had another instrument, which was merely a flat piece of iron with a hole in one end of it, the use of which was to hook on the canine teeth when they were irregular, and by a sudden jerk upwards remove them. We saw a tooth removed in this way, but the instrument was concealed, and it was done so cleverly that we could not find out at the time how it was accomplished.

In the above-mentioned case the dentist applied a powder to the gums quite freely at three different times, at each occasion letting it remain from five to ten minutes. We watched the case very closely, and concluded, from the dentist's movements, that he was about to extract the tooth; so, while he was looking for his instruments and a cloth to conceal the same, we took the liberty to open the patient's mouth and closely examine the tooth and gum, and, as was expected, found the tooth and gum positively unaffected: this powder was used for no other purpose but to deceive the patient and those observing the operation. In using the thumb and forefinger or either of the above instruments in twisting or pushing the tooth from its attachment to the gum, the tooth sometimes falls upon the floor of the mouth, and the patient spits it out at once, but more frequently it is left slightly attached to the gum. The tooth is then readily freed from its attachment by an almost unconscious or instinctive push or jerk of the tongue, and at the same time the tooth drops from the mouth; sometimes, however, when the tooth is not so loosened as to drop or be pushed out by the tongue, a little folded or twisted bit of paper is used, one end of which is so adjusted in the mouth that when the patient closes his teeth, which he is instructed to do, the loose tooth strikes or bites upon it; the operator then gives the paper a quick pull, and out falls the tooth.*

In removing this canine tooth the dentist, after applying the powder to his entire satisfaction, returned with a small piece of cloth, in which was concealed the flat iron instrument with a hole in one end, as described above; this he kept in his right hand, and in his left he had a piece of paper folded over a bit of some kind of wax pressed flat. This wax is called toothache plaster, and has in it some supposed charm or power to help loosen the tooth. After the powder had done its work, the dentist then struck the patient several slight blows in quick succession upon the cheek, just behind the region of the tooth to be removed with this charmed toothache plaster; this was done to divert the attention of the patient for the moment, while at the same time, with his right hand, he appeared to be rubbing the gum with this cloth, but in fact was adjusting the instrument upon the tooth; then, with a very quick jerk upward and outward, he dragged the tooth in part from its socket (the patient wincing considerably); this upward jerk was so quickly and adroitly done that it would be quite liable to deceive a close observer, having the appearance at most of an accidental catch on the tooth, or perhaps a hasty movement of the hand from the patient's mouth up over his head, as the operator stepped hurriedly back to his traps, which were lying behind the patient, as though he were in quest of another toothache plaster, which, in fact, was the case, and on his return he went through the same operation as before and out came the tooth.

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* I have several kinds of Chinese powders for loosening teeth, and have applied them to the gums according to instruction, and found in each case that they did not affect the gum or loosen the tooth in the least. I never have made a chemical analysis of either of these powders.—G. O. ROGERS.

There are many kinds of powders used by different dentists, but, as our friend confessed, they are all a sham. The recipe for the one he uses is as follows:

Ma-long-héung,
Ch‘ün-ú,
Ts‘ò-ú,
Shang-pún-há,
Pák-chi,
Ch‘ün-kung,
T‘ò-kau,
Pák-chéuk.

III. The insertion of artificial teeth has been practiced in China for ages before it was introduced into Europe, and has one great recommendation, viz., cheapness. In this respect, our Western dentists cannot rival the operators of the Flowery Kingdom. The material used is bone or ivory, and the tooth, having been sawn and filed into the proper shape, is fastened to the adjoining teeth by a copper wire or catgut string. If two or more teeth are required, they are made in one piece, and a hole drilled the whole length, through which a double string or wire is passed, which loops over the natural tooth at one end and is tied to the tooth at the other. This work, although rude in the extreme, is, as to looks, better than the absence of the teeth, and is of some use in mastication.

The cost of a single tooth will be from five to ten cents, and the charge for half a dozen would be from thirty cents to half a dollar. At these low rates all classes may avail themselves of the benefit, and those who practice the art do a thriving business.—*China Review*, Hong Kong, Jan. and Feb., 1877.

HINTS AND QUERIES.

"HE that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

I HAVE a young patient under my care who has a central incisor which has become discolored by the application of arsenious acid to devitalize the pulp at the hands of a brother dentist. What can be done to restore it to its natural appearance? It has been filled, but I have removed the filling.—W. A. S.

I WISH to know if, in extracting the inferior *wisdom* or *last molar* with the Physick forceps, it would be possible to break the jaw-bone, or if any such accident has ever occurred in their use.—J. B. T.

WILL some experienced dentist inform me what is the best mouth-wash to use after extraction of teeth to heal and harden the gums?—W. L. D.

DOES the *extraction* of a tooth ever produce "*lock-jaw?*"—M.D.

What is the best manner to *insert* and finish a gold filling so that the surface will not pit or show instrument-marks after being worn a few months or years? and what kind of gold would be best to use? I have seen *such fillings* put in by such operators as Butler, Cushing, McKellops, and Dean (of course being West I would see more of the work of western operators). Will some of the first-class operators reply, and state minutely every particular of the operation of *packing* and then the *process of finishing*, and give us a clue to the SECRET of durable polished surfaces?—A. J. R.

SLEEP VS. ANÆSTHESIA.—In the report of the proceedings of the American Dental Association, published in the DENTAL COSMOS, February, 1877, page 73, there is an extract of a paper written by Dr. Cassidy, in which, speaking of nitrous oxide, occurs the following statement: "A course of experiments, continued for some years, has convinced the writer that this gas is a supporter of respiration, provided the carbonic acid, which accumulates under its administration much faster than under ordinary breathing, be freely and constantly expelled. Observing this precaution, its administration may be continued indefinitely, the individual, meanwhile, being natural in feature and perfectly unconscious; but if, as is the case in the ordinary administration of the gas, this be neglected, an alteration from the natural to an appearance bordering on the horrible is produced."

I should like to know by what method Dr. Cassidy obtains the results named, and if he is quite certain that the alteration alluded to is due entirely to the retention of carbonic acid gas?—A. J. PULLING.

"WHY is not charcoal a good dentifrice?"

Because the action of the brush will work the particles of charcoal into the gum, and after a while they will have the appearance of being tattooed. See COSMOS, vol. xii. No. 10.—D. M. C.

IN answers to "Creasote" in June number of DENTAL COSMOS, one of the best reasons for wiping out a cavity of decay with creasote was not mentioned, that is, its property of showing the exact position and extent of the decomposition of tissue, which we all know it does. Let one who has never used it remove all the decayed dentine visible, and as carefully as possible, then wipe the cavity out with creasote, and he will be surprised at the amount of discolored and diseased tissue still in it.—M. C. S.

REPLY to G. L., who asks the best treatment in regard to offensive breath.—The best remedy that has ever come under my observation is pulverized charcoal—two or three tablespoonfuls per week, taken in a glass of water before retiring for the night.—C. A. R.

ANSWER to "Dix," who asks the best treatment for exposed pulp fillings.—I would advise the use of lacto-phosphate of lime next to the pulp, filling over it with oxychloride of zinc. This is my plan, and I have never experienced any trouble from it.—T. A. GOODWIN.

REPLY to "Dix," in April COSMOS.—Do not try to use the oxychloride of zinc over an exposed or very nearly exposed pulp; there is not one in a hundred that will bear it. If you use it as a temporary filling very near a pulp, first cover the bottom of the cavity with Fletcher's artificial dentine (any healthy pulp will bear it), then put your oxychloride of zinc over it. Or first cover the bottom of the cavity with oxide of zinc and solution of carbolic acid, then dry the cavity and fill. I prefer the artificial dentine, because it hardens sufficiently to keep its place even when filling over it with gold. Sometimes in very large cavities I use the artificial dentine, then partially fill with oxychloride of zinc, finishing with gold or tin. Of course, when I say "bottom" of the cavity, I mean the points at which the pulp is nearest exposed; any one knows where they are in any given case.—M. C. S.

Reply to G. B., who inquires concerning Elaterium.—The use of this medicine is signified in the derivation of its name, "active purge." In plethoric persons elaterium is frequently employed with the intention of breaking up an inflammation through the large and watery stools obtained from its employment. To such an end it is admirably adapted; indeed, so reliable is it that there are practitioners who depend upon it as upon a something that is sure not to fail them. In the dose of half a grain the discharge of pints or even of quarts of water is not infrequently secured, and, as will be understood, such discharges may be all-sufficient to relieve an over-congested part.

As the action of this medicine differs with the circumstances of a case, much care is to be exercised in its administration. The writer is familiar with examples where a quarter of a grain has almost drained the blood of its watery constituents, while in other instances two grains have been attended with but trifling results.

Elaterium in the dose of one-twentieth of a grain may be used with a view to a diuretic effect; this, although not so speedy in manner of aborting a congestion, is not infrequently found to be quite as effective as the more heroic manner of treatment.

When periodental inflammation has associated with it much œdema of the soft structures of the face, the use of elaterium is to be particularly recommended.

Elaterium is most conveniently administered in pill form.—S. N.

Answer to E. G.—Between sarcoma and cancer the difference is alone one of degree. Any and all tumors which are not of self-explanation—that is, which are not to be accounted for by some derangement, anatomical or physiological, of a part in which they are situated—are to be esteemed as neoplasms proper. The adoption of this rule affords a diagnosis to any and all kinds of tumors, and is so reliable that the most experienced find greatest security in being influenced by it. Neoplasms vary in expression all the way from the most simple of the fibromata to the most complex of the encephalomata. The characters of neoplasms differ about as do the different individuals of a common family. No two children of a common parentage are precisely alike. The treatment of the neoplasms is alike. The treatment of the self-explaining tumors differs with each one of the class.—M. E. E.

Answer to E. G., June, 1877.—E. G. would be justified in feeling confused at the careless use of histological terms by many people and books. "Sarcoma" literally means a flesh-like tumor, but is *properly* used only when it refers to a distinct class of tumors, first pointed out by Virchow.

This class is composed of all morbid growths originating in the morbid proliferation of connective tissue anywhere in the body. They are made up of large or small, round or spindle cells, often without any distinct intercellular material. They often do not return after excision, and *do not* spread by infection of neighboring glands, but by metastasis.

"Cancer," as *popularly* used, means any malignant growth, and many only semi-malignant,—*e.g.*, lupus. Histologically they are growths arising not from connective tissue, but from epi- or endo-thelia,—*e.g.*, surface of body, all cavities, lining of blood- and lymph-vessels,—and are made up of epithelial cells. They usually return after removal, and almost always spread by means of lymphatics and glands. Hence origin, structure, and prognosis are very different.—SIGMA.

ANSWER TO J. M. T., JUNE, 1877.—The dentinal tubules were long supposed to be mere passages for nutritive fluids, but recent investigations leave no doubt of the fact that they contain, during life, the so-called "Tomes's fibers," which are delicate, tail-like processes springing from the cells called "odontoblasts," which cover the periphery of the tooth-pulp in a thin layer.

The nerves of the pulp send off very fine dichotomous branches, which accompany the Tomes's fibers into the dentine tubules.

If J. M. T. desires to verify these histological facts and can use a microscope, I shall be happy to communicate through the DENTAL COSMOS the simple and easy means of doing so, as taught regularly in my histological classes.—SIGMA.

REPLY TO J. M. T., who asks concerning the passage of nerve-fibrillæ into dentine.

To satisfy one's self that there is an unbroken halitus between the pulp of a tooth and its dentinal vault it is only necessary to make examination. The writer is so well satisfied that there are no nerve-fibrillæ of the class alluded to by J. M. T. that he can only express surprise that there are people yet to be found who hold to such a conviction. That there are, however, not infrequently threads of spore-like matter to be met with in dentine is not to be disputed, but these threads are not nerves, but are, on the contrary, expressions of disease. Their presence is explained as follows:* "An observation of the pulps of certain teeth which have been exposed to irritation in cavities unopened as well as open will exhibit the existence of fungoid excrescences. Only very lately it has happened to the author to open several teeth which had been partially destroyed by caries, the pulp-chamber, however, being intact. In two of these cases a magnifier of very ordinary power exhibited thread-like excrescences of most minute and fibrillæ-like appearance passing in clusters from the surface of that portion of the body of the pulp adjoining the cavity of decay. These excrescences were, in each instance, of a pearly-white color, and might well have been likened to bundles of the most delicate cobwebs. It is suggested to the attention of the microscopist that it may be possible that such excrescences passing into the tubular structure have been mistaken for nerve-fibrillæ. Without qualification, however, the author believes that exception may be taken to the doctrine of nerves passing from the pulp into the tubules. It scarcely seems to need the microscope to demonstrate the correctness of such an opinion. That fibrillæ, however, may be found in teeth of loose structure, being inter-tubular, may readily be received as a fact, but their origin is to be sought for in the enamel membrane, and not in the dental pulp."

Too little attention, it seems to the writer, is given to the functions of the enamel membrane. The physiological office of this organ is, perhaps, the most important of any associated with a tooth. When it dies, necrosis is an almost certain result.

It is suggested to J. M. T. that he make observations for himself through the means of the teeth of the calf; the cutting open of half a dozen of these teeth in various stages of development will be quite sufficient to make the matter about which he asks sufficiently clear.—A. R.

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* See Garretson's System of Oral Surgery, page 361.

Reply to E. T.—In acute tonsillitis the danger lies in congestion. To relieve the swollen and over-gorged parts a cupping-glass may be applied to the neck.* In conjunction with this local means it is desirable to immerse the feet of the patient in hot water. As a medicine to be used, the following is deemed by many physicians a specific:

℞.—Olei terebinthinæ, ʒij ;
Pulveris potassæ chloratis, ʒij ;
Pulveris sach. alb., ℥ss ;
Pulveris acaciæ, ℥ss ;
Aquæ, ℥v. M.

To be well shaken, and to be swallowed slowly in teaspoonful doses, repeated each hour until relief is obtained.

When danger of suffocation is present it is imperative to make free scarification of the parts.—M. C. S.

In reply to J. L., as to the best course to pursue in case of diarrhœa from irritation produced by teething, I would say that, unless excessive or chronic, the diarrhœa needs no treatment, and will do no harm, while the suppression of it is almost sure to. The question of local treatment in teething is an open one, and you may safely take the natural way, which is to restrict or regulate diet and let alone.—M. C. S.

Answer to J. L., who asks concerning a case of diarrhœa arising out of dental irritation.

Mr. Editor of the Cosmos, please say through your pages to J. L., who, by the way, does not state whether the case be one of the first or of the second dentition, that a judicious practitioner finds direction in the circumstances of his cases. Dental irritation is of markedly two-fold character; it may pertain exclusively to the vascular system, or on the other hand to the nervous. As the first is concerned, a sufficient evidence is afforded in the local disturbance exhibited; as to the other, a diagnosis is to be arrived at through the process of exclusion.

In infants who suffer from intestinal disturbance the result of an irritation arising out of continuity of structure, it is all-important that attention be directed towards the local lesion. Where the gum overlying an erupting tooth is found hot and swollen, it is necessary to deplete the part by free lancing; if general excitation has been induced it will be found well to administer the bromides combined with fitting doses of tincture of veratrum viride,—say, for an infant, five grains of the bromide of potassium in a tablespoonful of water, to which is added from one to two drops of the veratrum viride. This to be repeated *pro re nata.*

In hot weather diarrhœa is very common with infants. When, in these cases, dentition is in progress, an oft-repeated local depletion may be necessary for the preservation of a child's life. There are, however, a multitude of cases where the irritation is confined so markedly to the nervous system that no local disturbance shows itself; these are the examples in which the demand is positive for sedatives.

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* In the absence of the ordinary cupping-glass a good substitute is furnished by a common wine-glass. A piece of paper saturated with alcohol and set on fire furnishes the required vacuum.

Children during the period of dentition are frequently sent to the sea-shore, a trust being indulged that the bracing character of the air will tide them over the depression ; this is very well, but if diarrhœa be present, little good will be found to be derived. The writer would urgently recommend as a most reliable remedy for the infantile diarrhœa of hot weather the following formula; the medicine to be administered in teaspoonful doses, repeated each one, two, or four hours according to the urgency of a case:

℞.—Myristicæ pulveris,
Bismuthi subnitratis, āā ʒij ;
Cretæ preparatæ, ℈ij ;
Syr. zingiberis, ℥iss. M.

Still another most valuable combination is found in the following powders, which are to be given mixed in water or syrup:

℞.—Hydrarg. chl. mite, gr. ij ;
Pulveris opii,
Pulveris ipecac., āā gr. j ;
Magnesiæ carbonatis, gr. xii. M.
To be divided into eight powders. One to be taken every two hours.

When fever is present, and this is very common, a very palatable febrifuge is made by mixing sweetened lemon-juice with ice reduced to powder. Children take this freely; it may be given with all freedom, an only precaution being to avoid milk immediately before or after. Another valuable remedy in fever is found in the frequent sponging of the body with vinegar and water, or with water and alcohol; no means afford a quicker or more decided relief.

When a child is found much reduced in strength because of the persistence of a diarrhœa, it is desirable to resort to the use of such wine as contains a large percentage of tannin. In this direction mention may be made of the red wines of Egg Harbor. The finest wine of this class ever met with by the writer is that produced in the vineyard of Mons. Voluska, of that place. As a tonic it surpasses any preparation of iron that he has ever prescribed. Used as a simple stimulant it is without special virtue.

In the infantile diarrhœa of relaxation much occasion is found for the use of astringents. A good combination is as follows:

℞.—Acid. gallic., gr. xii;
Tincturæ cinnamomi, ʒiss;
Tincturæ opii, ♏ viii;
Aquæ carni, ℥ij. M.
Dose, two teaspoonfuls every three hours.—N. O. S.

Reply to W. H. H.—In response to the request of "W. H. H.," I would make the following suggestions, endeavoring to be as explicit as possible, and hoping that he will be benefited thereby: In repairing *some* celluloid plates it is extremely difficult to obtain a perfect union between the old and the new. I refer to those cases which have been in use for some time and have absorbed the secretions of the mouth. In all cases where repair is designed I proceed as follows: first, I obtain a model of the case; and just at this point let me impress upon the mind of "W. H. H." the necessity of having a good hard plaster. I always use the coarsest variety, which, after having set, will be hard enough to resist the power necessary to force the celluloid in the proper direction, for it is a well-established fact that celluloid must be manipulated very much in the same manner as a turner prepares a piece of green hickory,—*i.e.*, must be forced into the desired shape and *retained there* until seasoned. After having accomplished this much, I proceed exactly in the same manner as if I desired to mend in rubber, viz., filing dove-tails and countersinking holes. I then attach my tooth and invest, using the coarse plaster before referred to; and in investing I always place the piece in the smaller half of the flask, and am careful to see that the two sections are brought perfectly together. On opening the flask, I remove the wax and moisten the part to which I desire the celluloid to adhere with spirits of camphor. I then prepare my piece of celluloid, allowing sufficient for a surplus, and permit it to soak in spirits of camphor for a few minutes, until it becomes quite adhesive; I then prepare to press.

A great deal might be said relative to the merits and demerits of the various processes recommended to attain this object, but I have found by actual experience that the plain protoxide of hydrogen (water) is preferable to any other for *repairing;* but for *new* work I always use the dry heat process, being careful not to carry the heat too high, for fear of driving off too much of the camphor, which, as we all know, is the strength of the material.

I have had my old celluloid apparatus fitted up with a tin top, and this constitutes my *oven.*

In conclusion, let me say to "W. H. H." that I think if he will follow my directions in regard to using the hard plaster for investing and the plain water for pressing, he will experience very little difficulty in repairing celluloid. My sympathies are with him, for many were my failures in this direction until I adopted the plan described; but now, when I undertake a case, it is with the certainty of obtaining success.—F. F. DREW, D.D.S., *Baltimore, Maryland.*

STUDENT, South Carolina, is advised to inquire of the officers of the South Carolina State Dental Society.—EDITOR.

B. T., who asks about the method of working celluloid, is advised to read the directions published by the Celluloid Company, and the various communications which have appeared in this department of the DENTAL COSMOS during the last two years.—EDITOR.

W. S. S. is referred to the series of papers on "Riggs's Disease" in recent numbers of the DENTAL COSMOS. Will find information on his second question in the text-books.—EDITOR.

DENTAL EXOSTOSIS.—This affection, which it is almost impossible to diagnose with certainty, is doubtless frequently the unsuspected cause of severe and protracted neuralgia, though, *en passant*, I may be allowed to say that I have seldom met with it except in connection with what may be termed a peculiar diathesis. Neither does there seem to be any treatment efficient to prevent the troublesome hypertrophy, nor remedy when it has taken place except in the extraction of the afflicted tooth. Nor can we without danger of provoking tetanus replant such tooth. And yet, even the extraction of such a tooth will sometimes give us more trouble than we would willingly assume, and, worse still, result in even greater discomfort to the patient than was experienced from its presence.

I have recently had a case which puzzled me very much. A stout, healthy-looking lady, of about fifty years of age, consulted me concerning a severe neuralgia of the right temporal region. She had been previously under my care, and I knew by experience the tendency in her case to dental exostosis, having extracted five roots for her, which were all hypertrophied. I found a cavity, slightly exposing the pulp, in the first right lower molar tooth, and hoping to have discovered the secret of her neuralgia, I applied the proper remedies to the exposed pulp; but the pain grew more and more distressing, and the patient begged that the tooth might be extracted. Desiring, if possible, to avoid this necessity, I urged patience, and proceeded to make applications to devitalize the pulp. But a constant sense of uneasiness about the parts suggested that the trouble was not yet reached. I drilled out the nerve-canals and syringed with a mixture of water, alcohol, and carbolic acid, and, loosely packing the canals and cavity with cotton saturated with carbolic acid, I dismissed the case until the following day. To my surprise the patient reported that she had suffered intense and constantly increasing pain throughout the night. The annoying sense of fullness still continued. I could detect nothing wrong. The gingival margins were healthy-looking and tight. The tooth was not sore. Pressure or the stroke of an instrument did not intensify the pain. The sense of fullness of which she complained and my previous experience in her case convinced me that the cause of her trouble was exostosis. I accordingly extracted the tooth. The operation was not a difficult one, and my diagnosis was confirmed by finding an exostosis of the anterior root, but no larger than half of a pea. I never heard anybody scream *after* the extraction of a tooth as did this woman. I examined the socket carefully, but not even the thin edge of the process was broken, and there was nothing to account for the excessive pain of which she complained. Having, therefore, applied a pledget of lint saturated with laudanum and chloroform, I dismissed the case. Early the next morning I was summoned to her bedside by the announcement that her friends thought her to be dying. The patient was screaming with pain and grasping hysterically a glass of ice-cold water, which she was taking into her mouth and spitting out again a little the fastest I ever saw done. I learned that she had spent the entire night in this manner. She could hardly stop screaming to answer me a question when the ice-water was out of her mouth, and could scarcely grant me a moment in which to insert medicaments. I tried chloroform, laudanum, and acetate of morphia, until I became convinced that local applications were of no avail, and then resorted to a hypodermic injection of morphia, which put her to sleep. I ordered a tepid poultice on her cheek, to be kept constantly moist, and hoped the evaporation would lessen the determination to the parts. The next morning I found her at work at the ice-water almost as furiously as ever, and begging piteously for relief. I gave another hypodermic injection and ordered a blister behind the ear and one upon the nape. The third day, finding her but little, if any, better, I injected into the alveolus a few drops of a mixture of tincture of aconite and tincture of iodine, and packed the alveolus with lint moistened with carbolic acid. This treatment I repeated three times daily for two days, during which the pain was gradually diminishing, until it entirely ceased. The wound healed up very rapidly and the neuralgic pains entirely disappeared.

Now, what caused this severe suffering following the extraction? My theory is that the exostosis had made pressure upon the inferior dental nerve. My reason for reporting the case is the hope that some of my American professional brethren will be able to throw some light upon the subject.—VORSLUND KJAER, *Copenhagen, Denmark.*

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to Act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 342.)

CASES accumulated, examples of which may be found in the following:

CASE I. Miss H., sanguo-lymphatic; application to second bicuspid, superior left; made appointment for third day after. That afternoon the lady left the city to visit a sick relative; sent word to me next morning. Returned in *eight days*, and presented herself to make another appointment.

I immediately removed application and extirpated pulp. *Some sensation* and slight hemorrhage. Filled the tooth one week after. (Still my usual practice.)

It is over eighteen years since this tooth was treated; the filling, meantime, has failed at the cervical wall, and has been renewed. The tooth is still doing service.

CASE II. Mr. P., merchant; bilio-lymphatic; aged about forty; application to left superior central incisor. Left for New York the next day, and a day or two following was obliged to sail for Europe on business. Presented himself *eleven weeks* after, sandarac cotton plug still covering application; pulp slightly disagreeable; no soreness; prepared and filled the tooth. This tooth remained, doing good service, until the death of the patient, which occurred fourteen years after the operation.

CASE III. Mr. T., merchant; aged thirty-eight; nervo-lymphatic; made application to left *inferior* second bicuspid. In consequence of immediate departure for the West, an appointment was made for the following month, it being supposed that he would have returned by that time; a much greater delay supervened, and it was *one year and three days* before he presented himself for further operations. Everything, even to the cotton and sandarac varnish, was found as it was placed the year before; the tooth had not given any inconvenience. The pulp was extirpated, and a filling introduced.

This filling failed after ten years' service, and was renewed two years since. The tooth is still doing well, more than *twelve years* having elapsed since the application was made.

As I have said, these are but examples of scores of cases which, having come under my observation as the result of accident, or neglect on the part of patients, or of design upon my own part, seemed to me full of interest and instruction.

It certainly is a matter of great moment, both to dentist and patient, that this operation of devitalization and exirpation should be thoroughly understood, and properly,—*if possible, painlessly*, executed.

It would have been strange had I not thought that these experiences, gained largely by unintentional practice, should be cautiously and solidly verified as a basis for future operating; and (again as I have said) I, *therefore*, long ago, commenced a *gradual increase in length of duration of applications*, watching carefully the cases, until *time* has told me that I can, with perfect safety, permit them to remain *until the pulps are dead.*

This renders their entire removal a painless and comparatively easy task to accomplish, and permits an assurance which does much toward removing all terror from the minds of those who are compelled to submit to this *usually very painful* operation.

From what I have given under this head of "*duration of application*" it must readily be perceived that I regard all textual directions as to the *number of hours* which shall govern the duration of an arsenical application as not only unworthy of any attention or belief, but as an erroneous presentation to the mind of some usually definite relation, in this connection, between *time* and *arsenical action.*

So far from this being actually the case, there is *almost no relation whatever.*

The *extremes* of arsenical action upon dental pulps, leave *time* so entirely out of all consideration as to frequently give a possibility of completely painless extirpation in from three to five hours; and, as frequently, an impossibility of extirpation, except with intense suffering, with anything less than several consecutive applications of two or three days' duration each, or of one continuous application of two, three, or more weeks.

I have presented this matter thus, in order the more thoroughly to separate this ideal connection of *time* and *result.*

So many writers have followed the phraseology of the first one who suggested the propriety of *twelve* or *twenty-four hours* as the "length of duration" of an arsenical application, and who made *forty-eight* or *sixty* hours as the maximum of duration for safety, in consequence of apical irritation, that it has naturally come to be regarded as a matter of course that all pulps *ought* to be devitalized in the first-named *length of time*, and that all teeth were probably bordering upon that condition known as "periodontitis" by the last-named *length of time*.

In consequence of the former belief, pulps are broached and nerve-hooked while they have, oftentimes, even more than normal sensibility in consequence of hyperæsthesia due to irritation.

In consequence of the latter belief, as has been shown, periodontitis *may* oftentimes be induced by earnest, but misguided, efforts to ward it off.

The truth is, that pulp-devitalization is a process which is governed in its rapidity or its slowness, and in its severity, or its immunity from suffering, by the controlling influences of temperament and constitution, *almost* as markedly as is pulp-preservation.

I say "almost," because those peculiarities which depend upon temperamental and constitutional attributes, are more markedly *observable* in recuperation, than they are in devitalization.

The various phases of devitalization are usually more rapidly developed, and the process can be more decidedly controlled by the operator, than can the phases and process of recuperation.

The one (devitalization) can be *driven*, as it were, while the other (recuperation) must be *coaxed*.

But while all this is so, it is nevertheless true that pulps, *like individuals*, will sometimes succumb to an irritation of a very few hours' duration, and do this in a comparatively quiet manner; while other pulps, *like other individuals*, will resist the power of a similar irritation for days, and even weeks, and give frequent evidence of their struggles against fate, by paroxysms of severe suffering.

Thus it is that it becomes prudent for the dentist who adopts the practice of "short duration of arsenical preparation" to test gently, by means of a fine probe, the result of his medication before he commences the extirpation of his, possibly, still vital pulp ; while, on the other hand, it is no less important to the success of those dentists who desire, for the comfort of their patients, and the acceptable saving of their teeth, to embrace the "long duration" practice, that they shall feel *perfect confidence* in its feasibility, and entire reliance in the permanence of its apparent advantages.

I would, therefore, advise the institution of a *length of duration* of arsenical applications *based upon* the estimated individual capacity for resistance to devitalizing degree of irritation, and would thus suggest that, in teeth of loose texture, dependent for their resisting power upon feeble or sluggish constitutional attributes, applications of *limited length of duration*, say from eight to twenty-four hours, will be found sufficient to permit of comfortable pulp-extirpation (particularly in single-rooted teeth of *large pulp-caliber*); while in teeth of strong texture, in individuals of compact build, with the resisting attributes of robust constitutional power; or, again, in fine, shapely teeth with small roots and consequently small pulp-filaments in their delicate canals, and with pulps dependent upon a highly-organized nerve-structure, both local and systemic, I would equally suggest that a much more *extended length of duration* of application—say from six, eight, or ten days to two weeks, or even more—would be most frequently productive of desirable results.

It will be found, as has been hinted, that *usually* in proportion to the *large size* of the pulp, both in its bulbous and canal portions, so will devitalization be easily and painlessly effected, other things being equal; and thus the pulps of superior centrals and cuspids and second bicuspids will yield more readily than those of laterals and markedly bifurcated first bicuspids, while the canal portions of pulps found in the palatine roots of the molars will become thoroughly devitalized, while those in the buccal canals, especially the disto-buccal, will be yet almost as thoroughly vital, while inferiorly, the pulps of central incisors will usually be more intractable than those of the laterals, cuspids, and bicuspids; and canal portions of pulp in the distal roots of the molars will be easily removed, while yet the filaments in the canals of the mesial roots are exquisitely sensitive.

A knowledge of this will, on the one hand, advise as to the teeth, and roots, in which comparative immunity from the infliction of pain is probable, after an application of average length of duration; while, on the other hand, it enables one to guard against possible infliction in cases of partial devitalization, and prepares one for the liability to the necessity of further means of obtunding sensibility.

Before entering upon the discussion of secondary applications of arsenic, or other means for proceeding with pulp-devitalization, I wish again to refer, under this head of "duration of application," to the danger of continuance of application, first, in cavities between teeth, and second, in cavities impinging upon gum, cheek, tongue, or lip-tissue.

1st. *Cavities between teeth.*—As I have been earnest in antagonizing the doctrines of the relation of *time* as a rule to guide the judgment in regard to the action of arsenic, and equally desirous of combating the idea of *danger from arsenious applications* having any connection with the apical foramen, so I desire to impress firmly the conviction that there is *great danger* connected with the use of arsenic, and that in some instances *time* has much to do with the possible evil results.

I have already referred to the *great danger, which does certainly exist*, if arsenious acid is unfortunately permitted to escape from out of the cavity in which it is placed.

I wish to repeat the need for the precautionary measure of escharing the mucous membrane covering the gum between teeth, by means of creasote or oily carbolic acid, as a preventive to the absorption of any escaping arsenic.

I wish the directions in this matter to be carefully read, and to be regarded, as they are, in my opinion, of *immense importance.*

As I have expressed myself decidedly in one direction, I desire to be as decidedly understood in this other direction.

As I have written giving large scope in what I regard as a perfectly safe direction, much misrepresented and much misunderstood, I wish also that it shall *not be charged* to me that I have given such latitude in the use of this valuable medicament as to make of it rather a curse than a blessing.

Therefore, in my practice, I *never* make an arsenical application in a cavity *between teeth*, even with all my directed precautions, and allow it to remain longer than from one or two hours to four or five hours, at most.

I prefer the shorter time, and, at its expiration, the application should be removed, and sufficient entrance *into* the pulp-cavity be made to permit of an accurate application *within its confines.*

Before this is done, all the original guards against danger to gum- and bone-tissue, mentioned previously, should be placed, and then, with *utmost care*, the tiny application of the arsenical paste should be made upon the little pellet of cotton, or from the end of a probe, *into the pulp-cavity.* This being carefully covered with a pellet or pellets of cotton, dipped in creasote or carbolic acid, and accurately adjusted in position, makes the safest *possible* arsenical application in such cases.

And even then it is far safer to *err* on the side of insufficient *length* of *duration* of application; for a day or two will permit a deeper, and *therefore*, a safer position for the arsenic; and in these places there is *no* positive security against danger, and no positive impossibility of untoward results, *until the need for the arsenical application no longer exists.*

When, therefore, a case of this kind presents in the latter part of the day, an obtunding application should be made of acetate of morphia and creasote, carbolic acid or oil of cloves, or of phénol sodique, preferably the former, and only the latter when morphia is contra-indicated, and thus a comfortable night be assured to the patient.

On the morning of the next day, the arsenical application should be carefully made, and allowed to remain from one to five hours according to the density of tooth and surrounding structures and resisting power of patient, when it should be removed and a deeper and safer application be made, in order to pass the second night.

If it is found still impossible to make one application of sufficient depth to insure safety, it is better to be content with the advance gained, and *treat as was done the day before.*

Almost certainly the *arsenious impress* will, during the second night, so act upon the pulp as to permit of a satisfactory second arsenical application on the morning of the second day; and, indeed, will in some instances so well do its work as to permit of painless extirpation at the third visit.

When, in despite of all care, some of the arsenic does escape, and, as will be the case, the gum is found dead, and the edge of the alveolar process is denuded and dying, the first requirement, of course, is the removal of all arsenic from tooth and surroundings, and this should be followed by a gentle, but thorough, cleansing of the cavity of decay, and the removal of dead soft tissue and moderate scraping of the denuded bone; then, allowing the blood to clot over the parts, a dressing of styptic cotton either dry, or wet with phénol sodique (I prefer Hance Brothers & White's to any other preparation of this article), should be pressed gently into position, and a few days be allowed for proper healing.

2d. *Cavities impinging upon gum, cheek, tongue, or lip-tissue.*—While the principles of practice in these cases are essentially the same as in cavities between teeth, the manipulation differs, in that, instead of desiring to prevent absorption of arsenic by destroying, with an escharotic, the mucous membrane of adjoining parts, we aim by elaborate protection to preclude that necessity. The application of arsenical paste should be made as small in bulk and as accurate in position as possible; after which, a small portion of the paste of acetate of morphia and oil of cloves should be placed upon a *dry* pellet of cotton, the morphia paste laid accurately and carefully over the arsenical paste, and the covering secured in position (if necessary) by ligatures.

If the cavity is on the buccal face of a superior second or third molar, or in any position where the cheek or lip is found to impinge decidedly, an extra pad of cotton wool or a little oblong piece of rubber cloth or rubber dam (preferably rubber cloth) should be placed between the application and the cheek, or lip, until such time as sufficient depth of application be attained to insure safety against arsenical ulceration.

(To be continued.)

THE DEVELOPMENT OF THE TEETH, AS RECOGNIZED BY THE AUTHORITIES OF TO-DAY.

(Abstract of remarks before the Pennsylvania State Dental Society, at Minnequa, July 10th, 1877.)

BY C. N. PEIRCE, D.D.S.

Gentlemen of the Pennsylvania State Dental Society: In offering you some remarks to-day I desire that it shall be distinctly understood that what I shall have to say upon the origin and development of the teeth will be but the presentation of the results of the investigations of others. I am interested in submitting these views, first, because they are quite markedly in contravention of those which have been previously accepted as correct, and, secondly, because I think they are worthy of the attention of every dental practitioner, if not absolutely essential to a professional education.

Previous to 1838 the various theories that had been advanced upon the origin and development of the mammalian teeth were somewhat vague and general, but during that year Goodsir presented a concise and systematic statement upon this subject, which was accepted and reproduced without modification in nearly all the works upon anatomy and physiology. Subsequently, other and further investigations were made and published, upon the teeth of reptiles, fishes, and other lower animals, demonstrating these organs to be muco-dermal appendages, though accepting Goodsir's theories respecting the mammalian teeth.

Since 1863 Professor Kölliker's investigations have led him to the conclusion that there was no marked difference between the origin and development of the teeth of mammals and those of the animals classed below them, and his views have subsequently been elaborated and confirmed by such prominent scientists as Waldeyer, Kollman, Hertz, Legros, Magitot, Wedl, Tomes, and others. So to-day, instead of reiterating the theory of the primary dental groove running around the circumference of the jaws, from the bottom of which arise independent uncovered dental papillæ corresponding in number to the deciduous teeth; these papillæ becoming covered by the development of opercula or lids and successively passing through four progressive stages,—viz., a primitive dental groove, a papillary stage, a follicular stage, and an eruptive stage,—we recognize the origin of the human teeth, in common with those of other animals, to be from an inflection of the stratum Malpighi or columnar epithelium which forms the germ for the future enamel, and is what may be called the rudiment of the enamel organ. This organ is further developed by a rapid proliferation of cells, and an extension and dipping down of its extremities, until it presents a concavity looking inwards, with the convexity towards the mucous surface, or, as Professor Tomes describes

THE DEVELOPMENT OF THE TEETH.

AGE.	DECIDUOUS.					PERMANENT.							
	INCISORS.		CANINES.	MOLARS.		INCISORS.		CANINES.	BICUSPIDS.		MOLARS.		
	Central.	*Lateral.*		*First.*	*Second.*	*Central.*	*Lateral.*		*First.*	*Second.*	*First.*	*Second.*	*Third.*
7th week.	Appearance of the epithelial eminence, the epithelial inflection, and the epithelial bands, or enamel organs of the temporary teeth.					No trace of germs.					No trace of germ.	No trace of germ.	No trace of germ.
9th week.	Appearance of, in close proximity with the downward extremity of the epithelial bands, the first trace of the dental germ, nearly simultaneously for the whole of the temporary teeth.					do.					do.	do.	do.
10th week.	The walls of the follicle, detached from the base of the dentine germ, rising up its sides, occurring in the same order as the preceding.					do.					do.	do.	do.
15th week.	The follicle continues its development. The epithelial germ progressing in its transformation into an enamel organ.					do.					Appearance of enamel germ from epithelial inflection.	do.	do.
16th week.	The wall of the follicle is closed, the epithelial band is broken, and the follicle is thenceforward without any connection with the epithelium of the surface.					Appearance of the epithelial band derived from neck of the enamel organ of corresponding deciduous tooth.					Continuing its development.	do.	do.
17th week.	Appearance of the cap of dentine and enamel in incisors and canines.					Development of enamel organ progressing.					Appearance of dentine germ.	do.	do.
18th week.	Appearance of the cap of dentine and enamel in molars.					do.					Appearance of wall of follicle.	do.	do.
20th week.	Septa formed between teeth, connecting external and internal walls.					Appearance of dentine germ.					Follicle progressing in development.	do.	do.
25th week.	Calcification of septa commencing.					Appearance of wall of follicle.					Cap of dentine appearing.	do.	do.

28th week.	Enamel and dentine progressing in calcification.	The wall of follicle continuing its development, and the enamel organ progressing.	Dentine and enamel increasing.	do.	do.
32d week.	do.	do.	do.	do.	do.
36th week.	do.	do.	do.	do.	do.
40th week, or at birth.	Roots of teeth forming, by elongation of dental pulp and deposition of dentine thereupon.	Closure of wall of follicle; no formation of dentine and enamel until second month after birth.	Dentine and enamel thickening.	do.	do.
3 months of age.	Crowns advancing towards mucous surface, by elongation and calcification of dentinal pulp, and the adhesion to its surface of dental sac, forming cemental matrix.	Calcification of enamel fibers, and deposition of dentine in dentinal pulp.	do.	App. of epithelial band for enamel germ.	do.
7 to 9 months of age.	Eruption of incisors, inferior and superior.	Increased thickening of enamel and dentine.	do.	Continuing its development.	do.
14 to 16 months of age.	Eruption of first molars.	do.	do.	do.	do.
17 to 18 months of age.	Eruption of canines.	do.	do.	do.	....
18 to 24 months of age.	Eruption of second molars. Temporary dentition complete.	do.	do.	do.	....
3 years of age.	....	Crowns advancing and growth of roots.	do.	do.	Appearance of epithelial band from epithelial inflec'n.
6 years of age.	....	do.	Erupted 1st permanent tooth.	do.	Contin. develop'g.
8 to 9 years of age.	....	Incisors, superior and inferior, erupted.	....	do.	do.
10 and 11 years of age.	....	Bicuspids (pre-molars) first and second, erupted.	....	do.	do.
12 years of age.	....	Canines, superior and inferior, erupted.	....	do.	do.
12 to 13 years of age.	....	....	....	Erupted.	do.
18 to 25 years of age.	....	....	....	....	Erupted.

it, as a bell attached by a thin cord of epithelium, connecting it with the epithelium of the surface.

Beneath this, and occupying the concavity made by the dipping down of the extremities of this organ, the dentine germ makes its appearance, being derived from the embryonic tissue of the jaws, and quite distinct from that of the enamel organ, which alone is directly derived from the epithelium layer. As this dentine germ progresses in development, increasing in size by the multiplication of the cells forming its peculiar structure, we have differentiated another structure, which is termed the dental follicle or sac, from which originates the third tissue,—the prospective cemental membrane or matrix; this, increasing in thickness and extending up the sides of the previously organized dental structures, eventually incloses the developing tooth, and, though it is not yet fully demonstrated, it doubtless has much to do with the nourishment not only of the future cement, but also of the alveolar process or spongy bone which surrounds it and forms the socket in which the root is eventually implanted.

It is not my purpose, however, to present an elaborate essay upon the development of the teeth, but rather to exhibit the accompanying chart, which I have arranged for the purpose of showing the order and time of some of the more important progressive steps in dental development, presenting with this such verbal explanations as may be required. For the general arrangement of this chart, as well as for some of the statements thereon, I am indebted to Magitot, as quoted in Mr. Tomes's book; endeavoring to make it consistent with the accepted theories of to-day, and so systematizing it that it may readily and effectually meet the requirements of those seeking information upon this subject. For a more thorough and detailed account of each progressive step in the development of the teeth, I take great pleasure in referring to the admirable work on Dental Anatomy, to which I have above alluded, by Charles S. Tomes, M.A.

In further discussion of this subject, a query as to the relation existing between the early period at which we find development taking place, and the durability or destructibility of dental structure will be quite appropriate, and also as to the relation of these progressive stages of the maturing tooth to the general health.

In every normal tooth we recognize three differentiated tissues, enamel, cementum, and dentine, each laid down or having its origin in soft structure (protoplasmic material), and owing its hardness to the impregnation of the salts of lime; but this latter condition is not accomplished until after passing through various progressive stages of development, in which the processes of disintegration and reconstruction (the latter the more rapid), which characterize life, have previously been active.

"A process of waste, resulting from the decomposition of the molecules of the protoplasm, in virtue of which they break up into more highly oxidated products, which cease to form any part of the living body, is a constant concomitant of life. The new matter, taken in to make good this constant loss, is either a ready-formed protoplasmic material supplied by some other living being, or it consists of the elements of protoplasm, united together in simpler combinations, which, consequently, have to be built up into protoplasm by the agency of the living matter itself. In either case, the addition of molecules to those which already existed takes place by interposition between the existing molecules of the living mass."

In these processes of disintegration and of reconstruction the living body grows by virtue of the constructive process being the more rapid, and the increase of size which constitutes growth is due to a process of "molecular intussusception" differing altogether from the process of growth from accretion, which is effected by the external addition of new matter.

The query to which we are now naturally led is respecting the essential conditions of healthy or normal development. The complex molecular mass with differentiated prospective results, must depend for its normal construction upon its original constitution, on the one hand, and, on the other, upon the character of the energy supplied to it during development.

How to secure normal or healthy constitution and subsequent construction of tissue is the great problem of life, for poisons both by inheritance and acquisition are constant dangers. An inherited poison is not only responsible for primarily diseased fiber, but may be the cause of a subsequent inflammatory condition which shall exclude the ordinary or normal process of nutrition, by interfering with healthy digestion, healthy respiration, and healthy excretion, any one of which being disturbed, the formative process, in a part or in the whole body, may be faulty.

Independent of these processes, pathologists consider that "there is something in the blood itself which is at least as essential to the continuance of its right and healthy state as these are, and which is indeed often occupied in correcting the errors to which these more than itself are subject, viz., the power of assimilation or maintenance which the blood possesses, in and for itself, as perfectly, and at least as independently, as any of the tissues. By this assimilative power of the blood it is that the tissues are continually guarded, for by it many noxious substances introduced into the blood are changed and made harmless before they come to the tissues; nor can any substance, introduced from without, produce disease in an organ, unless it be such an one as can escape the assimilative and excretory power of the blood itself."

Now, the theory of specific diseases, expressed in its most general terms, is, that " each of them depends on a definite and specific morbid condition of the blood; that the local process in which each is manifested is due to the disorder produced by the morbid blood in the nutrition of one or more tissues; and that generally this disorder is attended with accumulation, and leads to the discharge, or transformation, of some morbid constituents of the blood in the disordered part. It is held, also, that in some specific diseases the morbid condition of the blood consists in undue proportions of one or more of its normal constituents; and that in others some new morbid substance is added to or formed in the blood." In either case, the theory is, that the phenomena of each specific disease depend chiefly, and in the first instance, on certain corresponding specific materials in the blood, and that if characteristic morbid structures be formed in the local process, they are organs in which these morbid materials are incorporated." This brings us, naturally, to the suggestion made a few moments since, viz., the relation existing between the original constitution of the molecular mass and the character of the constructive forces at the early period at which development commences, and the durability of dental structure.

We have seen that by the seventh week of embryonic or intra-uterine life we have an inflection of the columnar epithelium which forms the germ or rudiment for the future enamel of the deciduous teeth; and we learn from our chart that these teeth pass through their various progressive stages up to the calcification of their crowns during embryonic life; and experience gives us an additional fact, viz., that in a very large majority of cases these present upon their eruption the appearance of well-shaped and apparently perfectly developed teeth, and even where the infant has inherited from its parents a specific taint these organs upon eruption show at most but little, and often not any, evidence of interrupted or morbid nutrition.

This is quite consistent with a statement which is recognized as an aphorism in surgical pathology, namely, that syphilitic infants, if living at birth, almost invariably present the aspect of good health, the specific poison having had but little influence in directly retarding development; the characteristic inflammatory symptoms not presenting themselves until two or three months later. But these flattering appearances may be altogether deceptive. Among the first tissues to be affected by specific poisons are the superficial,—the mucous membrane and deeper layers of epithelium, in which, as we recognize, the enamel germ has its origin. When either parent, at any time previous to conception, or the mother during the embryonic life of her offspring, has been the victim of such morbific influence, that offspring must, by virtue of it, not unfrequently suffer from the early disintegration of either its temporary or permanent teeth, and probably both, this being governed by the periods of the special inflammatory conditions; but in all the teeth of subjects of inherited syphilis, whether conspicuous in their peculiar shape and deficiency of enamel or not, the tendency or predisposition to premature decay must be great, in consequence of a degeneracy of structure resulting from a constant or persistent systemic poisoning.

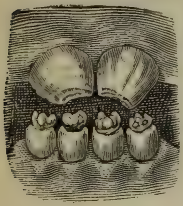
In speaking of specific poisons influencing the development of tooth-structure, I want to be understood as alluding not only to those inherited, but also to such as are acquired subsequent to birth and prior to ten or twelve years of age, for during all of this protracted period there are teeth in some progressive stage of development whose vitality and structural arrangement will in some degree be modified by morbific influences, which are but the local expressions of some general infection.

Notwithstanding the above statement, that syphilitic infants frequently present the aspect of good health at birth, it is recognized not unfrequently, by observing practitioners, that the deciduous teeth of infants whose mothers have suffered during the period of gestation from phthisis or any protracted inflammatory condition are quite deficient in both the quantity and quality of enamel. In some subjects with whom I have been familiar, born under such circumstances, the crowns of their anterior teeth were entirely deficient of enamel, while the posterior teeth showed deficiency both of quantity and quality.

Abnormal development of the permanent teeth, however, is of much more importance to both patient and operator than that of the deciduous, and it is a question worthy of consideration, whether the early period at which the germs of the first permanent molars are developed and calcified, has anything to do with their premature loss. There is one undisputed fact which we cannot overlook: the influence of the health of the first year of the infant upon the development not only of these first molars, but also of the anterior permanent teeth,—the incisors showing interrupted nutrition by more decided marking of the cutting edges, in consequence of the necessarily increased depth and thinness of the enamel in that location.

We see by our chart that the calcification of these teeth commences about the second month after birth, and progresses slowly, though continuously, until the crowns of the ten anterior teeth are perfected, which will be near the close of the fifth year.

Where a specific hereditary taint exists, it generally manifests itself by some decided inflammatory action during the second or third month, and to such an extent that nutrition and its concomitant results are interfered with in a marked degree; hence we have the permanent incisors marked as shown in the accompanying diagram, as the local expression of the general infection, and it is an expression which pathologists have no hesitation in pronouncing the result of hereditary syphilis. Now two very pertinent and important inquiries are, Will any other disease or morbid condition produce a like result? and, Does this result follow inevitably within a given period from the inheritance of this specific taint?



To the latter question we unhesitatingly say no; for, unless some inflammatory action has taken place during the development of these teeth, no such markings will be manifested upon them; or if the inflammatory period should be delayed until the second, third, or fourth year, then this local expression will not be upon the cutting edges or masticating surfaces of the teeth, but upon the labial, lingual, distal, and mesial surfaces, and its location will exactly represent the line to which development had progressed when the inflammatory action occurred; or if the health remain undisturbed until the eleventh or twelfth year, the crowns of all the teeth save the third molar or wisdom-teeth will remain unaffected by the disease, and the roots only will show abnormality. It is patent to every observing physician that infants are born with some peculiar condition of blood and arrangement of solid tissues which render them liable at various periods of life to certain forms of inflammation of special organs and parts, and unless these inflammations occur there will be little, if any, evidence of the existence of specific taint.

An illustration of this has recently been under my care, in which the infant and youth up to his twelfth year had been free from sickness; his permanent teeth up to this age in good condition; crowns free from markings of any kind. Owing to severe exposure to storm at this period, inflammation was set up around his left inferior first molar, and rapidly spreading from the alveolar process in this locality to the body of the bone, involved the ramus of that side and the whole of the inferior maxilla, resulting eventually in the loss of the bone from the ramus on the left side to the mental foramen and first bicuspid on the right, including, of course, all of the teeth over that extent of bone; the second bicuspid and first and second molar of the right side remaining intact and doing good service.

In this subject we have a remarkable instance of freedom from inflammatory action until after the eleventh year, yet but little doubt existing of an inherited taint of blood and tissue, rendering him liable from an exciting cause to certain forms of inflammation in special organs and structures.

The query as to whether any other disease will produce a like or a similar result, we recognize as difficult of answer, because of the uncertainty of obtaining reliable information. The permanent teeth are subject to malformations, differing in degree, and that any special disease has its peculiar marking is somewhat doubtful; but in nearly every case they can be traced to some severe illness of which the mother has a distinct recollection. In the large majority of cases, where the imperfection commences upon the cutting edges or masticating surfaces, and extends several lines in depth, even to a fourth or a third of the length of the crown, the mother will tell the inquirer that the child had a severe time in cutting its first teeth; convulsions for every tooth erupted, until it was fourteen or fifteen months old. In another mouth the cutting edges are all perfect, but, a third, half, or probably two-thirds of the way towards the neck of the tooth, is a line of pits, or imperfections, amounting frequently to a decided groove, from the absence of enamel, and varying in a degree corresponding with the severity or continuance of the morbid condition which occasioned them. These disturbing causes may have been whooping-cough, measles, scarlet fever, diphtheria, or smallpox occurring in the *second*, *third*, or *fourth* year, the location of the imperfections corresponding with the age, and their extent with the general systemic disturbance, probably modified by the condition of the blood, its freedom from poison, and its power of assimilation and maintenance.

THE CONSERVATION OF PULPLESS TEETH.

BY A. H. THOMPSON, D.D S., TOPEKA, KANSAS.

(Read before the joint meeting of the Missouri and Kansas State Dental Associations, at Kansas City, Missouri, June 6th, 1877.)

The operation by which teeth deprived of their pulps are preserved in health and usefulness is one of the most successful and beneficial services which the dental profession can render to humanity. The great number of teeth of this kind which are treated and preserved is a standing monument of the great good we are capable of conferring upon our fellow-man. Teeth in which the pulps have died become, in the natural course of the disease, so injurious to the parts in which they are located as to compel their removal, or very serious consequences are likely to result. The prolonged suffering which we sometimes witness, and the disastrous consequences that occasionally ensue from this lesion, should make us thankful that we have the means at command by which to combat it and preserve the organ.

In the following description of the methods pursued by the writer in treating the various ordinary phases of diseased, pulpless teeth, no claim is made to novelty, newness, or originality, but merely to the presentation of processes of treatment which have been almost universally successful, and which are recommended by their simplicity to the ordinary practitioner as of ready application.

Teeth that have lost their pulps are called "dead teeth;" but they are not really without life so long as the vital connection is maintained by means of the live cementum and periosteum. There is no doubt but that circulation of nutritive fluids continues between the investing tissues and the cementum, and this tissue of the tooth, at least, is kept alive; and as the canaliculi of the cementum are more or less connected with those of the dentine, the latter tissue may also possess some vitality, in its external parts in pulpless teeth, after conservative treatment. As a recent writer says (W. Matheson, *British Journal of Dental Science*, 1876), "a tooth has two sources of nutrition, the pulp and the alveolo-dental periosteum, and when it is cut off from both of these it becomes quite dead. When a tooth loses its connection with one or the other of these, but not both, it is said to be partially necrosed. Death of the pulp produces death of the greater part of the tooth, but that part (namely, the cementum, the outer layer of dentine in the root, and probably a minute quantity in the crown) which is supplied by the periosteal vessels may still retain its vitality, so that the tooth holds its place as firm as ever."

The principle upon which the methods of conservation of this class of teeth, to be detailed, are founded is, the *curing* and rendering undecomposable of the inner parts of the tooth-structure, after removing the pulp-remains as thoroughly as possible, by the complete and perfect saturation of those parts with carbolic acid. As illustrating this we will suppose and treat an example of each of the ordinary varieties of the disease.

First, as the simplest variety, we have a tooth in which it is necessary to destroy the pulp in order to check the threatening phenomena of periosteal and alveolar complication. After thorough devitalization by means of an arsenical application (once or more frequently, as may be necessary), a drop of pure carbolic acid is placed in the cavity and the pulp *débris* removed *through* the fluid, thus preventing air from entering the canal. If inflammation is not already present in the surrounding parts, and the tooth is not painful to manipulation, thorough extirpation of the pulp-remains should be at once accomplished; but if, on the contrary, there is much soreness, only partial removal should be performed at the first sitting, as continued manipulation might induce the dangerous periosteal irritation, which should be so sedulously avoided. As the soreness subsides from sitting to sitting, complete extirpation can be readily and safely accomplished.

The next step is the medication for the "curing" of the dentine lining the pulp-chamber and canals. This is done by repeated saturations with carbolic acid. The application is made by putting a drop of the liquid into the pulp-chamber, by means of a small spatula (made out of a flattened excavator shank), and causing it to flow into the canal by repeated thrusts with the probe, and displacing the air within, which will rise through the acid in bubbles. In difficult positions, owing to inversion of the tooth or proximity of the gum, the probe should first be wet in the acid and inserted into the canal, and the drop touched to this, and it will flow readily into the canal. A thin, tapering twist of cotton should then be packed into the canal with the probe, and the outer cavity filled with a retaining stopping, such as cotton and varnish, wax, gutta-percha, etc. This canal-dressing should be changed twice a week, and be continued for at least three weeks after all pain or soreness has disappeared from over the apex or in the tooth itself. This test treatment, after all symptoms of the disease have subsided, will insure the permanence of the cure, even though it may appear tedious to both patient and operator.

Continued soreness from any irritation will indicate longer treatment and more frequent dressing. *Over-treatment* should be carefully avoided, for there is a point beyond which continued medication cannot be carried safely. In many such cases the best treatment is a "tremendous letting alone." Discretion and judgment can only suggest these to the practitioner after some experience.

The next variety is that of a tooth in which the pulp has been dead some time, and with the chamber open, life having passed away some weeks or months before with more or less disturbance, and the tooth has now but little sensibility to pressure or percussion. Tenderness will, however, very nearly always be found over the apex of the root. The pulp is decomposed, and the varied aspects will be presented of mere brownish *débris*, pus and *débris*, or only pus. Careful removal of the *débris* will be the first step, to be followed by syringing well with tepid water. The critical point in this case will be in stopping the canal, and thus preventing the escape of pus and putrefactive gases, the parts having become accustomed to this accommodating vent. But this must be submitted to sooner or later, and after dressing well with carbolic acid, the canal and cavity must be stopped, and the case seen the following day, or sooner, if too painful. If pus is then found on the cotton withdrawn from the canal, periosteal complication is present, and great caution must be exercised to avoid further irritation. In this, as in other cases, care should be taken to avoid thrusting the probe through the foramen.

This case will require daily attention so long as pus is found in quantity, and the period lengthened to alternate days, and thence to twice a week, as gradual improvement takes place. Periostitis, acute or chronic, will be most readily combated by the application over the root of a mixture of equal parts of tinct. iodine and aconite, repeated as frequently as soreness arises.

The next variety is represented by a tooth which indicates a dead pulp by its dark color, soreness, etc., but in which the pulp-chamber is closed. The tooth may contain a filling or may not, and the best manner of securing communication with the chamber will be indicated by the case, either to remove the filling, or, if this is good and can be avoided, drill directly into the pulp-chamber, as near on a line with the axis of the canal as possible. At the same sitting all *débris* should be removed and the canal syringed, always avoiding irritation by too much manipulation. But if soreness will arise in defiance of care, applications to the gum over the root will be indicated, to be repeated as frequently as necessary. This case will probably require daily change of the dressing for a few times, and then the periods may be gradually lengthened to twice a week, as the sensibility to pressure on the tooth or over the apex slowly subsides. The dressing in this case, as in others, is then to be changed twice a week, until all pain or sensation is gone, and for two or three weeks after.

The next variety will be that of a tooth having acute periostitis from apical irritation, arising from pus exuded from the foramen of the pulp-canal. If closed, the pulp-canal should be opened, which will afford more or less relief by removing the pressure induced by accumulating pus and gases. Iodine and aconite to the gum, cleaning and dressing the canal, and probably the administration of a cathartic, will be indicated as necessary in order to outflank the probable result of the periosteal trouble,—swelling and suppuration. If the inflammation succumbs, daily dressing and applications to the gum until the soreness disappears will prevent a return, and then the ordinary periodic dressing must follow.

Sometimes the case will come to you with the swelling and suppuration already in progress. This we will call another variety. There will be the story of hours and days of agony and sleepless nights, and the aspect presented will be swelling and feverishness of the face, partial closure of the jaws, swollen gums, loose tooth, etc. The parts will require immediate depletion, which must be accomplished by lancing and scoring, then counter-irritants, as iodine, and a cathartic. Fomentations must be applied to the face, or roasted figs to the gum, to hasten suppuration, before total relief can be expected. The tooth being exquisitely tender and painful to the lightest touch, can, most probably, have but little done to it for a time; but as soon as possible the canal must be opened, to afford free exit to the pus and furnish vent to the putrefactive gases there collected, and which have been the cause of all the mischief. At the third day, if not before, pus is formed over the apex, and if it does not indicate a disposition to "point," it should be reached with the lance or drill. This operation, however, you will not always find practicable, and you will, in most cases, be compelled to wait until pus rises under the gum, and then lance deeply. The case will then be similar to the next variety we will consider,—*i.e.*, where a fistula is present, produced either by art or nature, with flowing pus, as in the preceding case after lancing. The swelling once subsided and the canal cleaned, carbolic acid should be forced through the apex of the root, by a sort of pumping motion, in the canal (with a piston formed by wrapping cotton on a barbed broach), and caused to flow out through the fistulous opening. This should be done frequently, while the fistula remains open, which will not be long. In some cases, when the fistula heals too readily, it will be necessary to insert a cotton tent to prevent granulation, that you may more thoroughly cauterize the abscess or cyst. In many cases you will not be able to force the liquid through both apex and fistula, and must then be content to treat in the ordinary way, by frequent saturation of the canal, and by injecting iodine into the fistula.

The next variety is that where there has been a fistula of long standing, and these cases will usually be very obstinate. They ordinarily present the phenomena of the periodic flow of pus, and perhaps an indurated cyst over the apex in which the abscess is located. The treatment indicated will be to force carbolic acid through the canal into the cyst and out of the fistula, if possible. But if this cannot be accomplished, even by enlarging the foramen (which is safe in this case), resort must be had to external injection with carbolic acid or iodine (or both), and with the accompanying risk of not reaching the cyst. Sulphuric acid has been recommended by those who have used it as very efficient in obstinate cases of this kind. Sequestrums from necrosed alveolus should be looked after in these cases and removed. When a hard, cystic enlargement is formed about the apex of the root by a fistula of long standing, it should be punctured and injected with iodine, two injections being usually sufficient for ordinary cases. But if perforation is impracticable, repeated external applications will usually, after some time, effect a cure.

The treatment of teeth, as such, is governed by a variety of controlling phenomena peculiar to each case. Crownless roots which are firm in the bone and useful in mastication are amenable to this treatment, and can be made more durable. Pivot roots should also be treated and cured before inserting the crown permanently.

Crowns which are mere shells should be well cleaned, as soon as periosteal inflammation subsides, and lined with oxychloride, leaving an opening communicating with the pulp-chamber, through which to dress the latter. Large cavities leading to the chamber should be treated in the same way, in order to stop the progress of decay while the treatment is going on, and thus preserve the strength and outlines of the crown.

An upper incisor or canine in which the pulp has died should be opened from the cavity on the proximate surface (where it will usually be located) toward the center of the shoulder upon the rear, in order to get straight into the canal. In some cases it will be necessary to drill directly into the canal in this location. After cleaning the canal and cavity well, and lining the latter with oxychloride, the carbolic acid should be worked upward into the canal, and then filled with the cotton twist, and covered.

The upper bicuspids are the teeth most frequently requiring treatment of this kind. Why this should be so we cannot tell, but such is the fact. Treatment of these teeth is almost as simple as with the incisors, except when the canal is divided, and then it becomes exceedingly difficult. If the small canals are both found, they should be preserved by the insertion of a small, tapering gold wire immediately they are cleaned, which is to remain there. The carbolic acid should follow the wire readily upwards into the canals, and the dressing will be done by putting the drop into the chamber and vibrating the end of the wire that protrudes. But if the canal cannot be found after repeated search, and drilling, careful saturation must be depended on, and more time must be given the case, and the after temporary filling remain longer than usual.

Upper molars must be opened from the proximate surfaces, when the caries so occurs, over the grinding face, in order to allow direct access into the canals. Sometimes a mesial cavity will allow of entry into the chamber without requiring much removal of tooth-substance from the grinding surface, but a distal cavity, never. The palatal root will be easily entered and cleaned, even when crooked; but the buccal-root-canals of upper molars are the most difficult of all varieties of root-canals in the whole denture to manage. If these canals are found (which can usually be done before drilling in the inside of the chamber, and thus avoid getting *débris* into the delicate passages), they should be entered at once, and preserved by means of gold wire. These wires keep the delicate passages open, and can remain permanently as the root filling. The palatal-root-canal is readily found and treated.

The wisdom-teeth are rarely amenable to preservation by this treatment, on account of too frequently possessing a multiplicity of canals, and of being too difficult of access to allow of perfect operation. When their preservation is desirable, however, the general plan of treatment must be followed.

Lower molars are peculiarly difficult on account of the flattened and narrow shape of the root-canals, so that it is rarely that all the *débris* can be removed from the outer parts or sides of the flat passages, and the central portions to the apex, the only part which can be well removed. In a few cases the canals can be well cleaned, as is usual in young persons, but in middle life it can seldom be accomplished. The only thing to be done, when the canals cannot safely be drilled out, is to trust to saturation and extend the treatment period.

Inferior bicuspids are simple, and occur frequently as demanding treatment for this disease.

Inferior canines and incisors occur rarely as having this disease, but are easily managed.

The central fact and principle of this method of treatment, is the repeated and continued saturation of the internal parts of the tooth with carbolic acid. This, we hold, will result in perfectly destroying all putrefactive matters in the pulp-canal, in the dentinal canaliculi and their ramifications, and in the crystalline substance of the dentine. Not only are putrefactive matters thus destroyed, but live organic tissue is converted into the insoluble and indestructible carbonate of albumen. From this substance no putrefaction can arise, and the clogging of the canaliculi by it will prevent the entry of organic fluids from the cementum, which, if once in the pulp-canal or the inner canaliculi of the dentine, could not return and would decompose.

When the pulp-canal of the root of a tooth has been thus saturated twice a week for two or three weeks after all sensibility of the tooth or the parts about the tooth has disappeared, it is ready for filling. The roots of bicuspids or molars which contain gold wires can be filled by covering the wires with oxychloride of zinc, quite fluid, and by vibrations and thrusts of the wire, causing it to flow up into and fill the canal, and, forcing the wire deeply into the foramen, leave it, taking great care not to push it through the apex. Other root-canals should be filled with tin-foil, which can be carried safely and surely to the apex by beginning with thread-like strips cut from a single sheet. This can be packed against the shoulder at the apex, and continuing to fill the canal, gradually increase the size of the strips until complete. The canal being filled, the next step is to clean the cavity well and fill it carefully with oxychloride of zinc. This should then remain, and the tooth be left untouched for six weeks or two months before inserting the gold filling. This probationary time is necessary in order to test the stability of the cure, and to allow all possible irritation about the region of the apex of the root to subside before subjecting it to the dangerous irritation of the force of filling with gold, especially if the filling is large, as it is likely to be in these cases. It must be remembered that the healed wound at the apex is but a cicatrix at best, and, from suppuration of greater or less continuance, in many cases the union is very weak and the health-force very low. Experience has demonstrated to the writer that this period of probation is a wise expedient, and has saved the mortification of failure in very many cases, which, by the instantaneous method, would have been sure to result.

When the permanent filling is to be amalgam, of course less care is required as to the irritation of operating, but less time will not suffice for a test period. Amalgam may, in some patients and under some circumstances, be inserted immediately the root is filled, but this is seldom permissible, and is always done at a risk.

Crowns which are completely excavated within by caries, so that little more than the enamel remains, and with small openings, may be preserved by filling carefully with os-artificiel. This material, being a cement, clings to the walls, and thus supports and upholds them, and renders an otherwise useless tooth of service for a long period. This material is preferable to amalgam in many cases of this kind, for obvious reasons.

Bleaching discolored teeth with bleaching chemicals is, in most cases, unsatisfactory and unsafe. A better method is to cut away as much of the discolored dentine from the interior of the crown as can safely be done without endangering its strength. This discolored dentine will nearly always be found to be partially carious and weak, and its removal, to a safe extent, will do no harm. This excavation will allow the translucent enamel to be brightened and appear more white by the removal of the darkened dentine from within, which caused the discoloration, and by filling the deeper and external parts of the cavity with oxychloride of zinc, which material will show through and whiten the crown. The chlorine it contains will also, in time, bleach the dentine. But if this process will not suffice, further benefit may be derived by drilling with a moderately-large bur upwards and outwards toward the upper outer part of the crown, *almost* to the enamel. By filling this passage with white oxychloride a decidedly lighter shade will be cast upon the whole crown.

Failures in the treatment of pulpless teeth by this method arise from (1) irregular, intermittent, or entire neglect of attendance by the patient. But while this relieves the operator from responsibility, it is none the less disastrous to the tooth. Incurable irregularity, that variety of intermittent attention which the distant residence or other circumstances of the patient compels, must be counteracted by a longer continuation of the simple dressing and extension of the period of probation. (2) From the impossibility of finding and filling the root-canals. This must be treated with long-continued saturation with carbolic acid. (3) From forcing the wires in small roots through the foramen, and from drilling through the side of the root in the search for a canal. In these cases it is usually only a matter of time as to the loss of the tooth, as the wire can rarely be removed or a perforation be successfully treated. (4) Perforation by caries below the alveolus is a frequent cause of failure, and will give no encouragement for treatment. (5) Obstinate suppuration. This is, fortunately, a rather rare occurrence, but usually promises ultimate failure. In the prognosis of all cases the temperament and physiological idiosyncrasies of the patient should be taken into consideration as important factors. Little can be hoped for often in the simplest cases, where combined conditions of chronic fistula and a bad constitutional "make-up" are presented and you are forced to proceed empirically and without promises. But again, in apparently good temperaments obstinate periostitis and suppuration will occur, which refuse to be quieted by all known means, and which increase with the taking of "colds," either slight or severe, as may happen. Reckless, hopeless filling has sometimes cured such cases, suggesting that the cause was, perhaps, the result of over-treatment. In most of these cases it is well, after exhausting all means on internal treatment, to fill the root and treat externally, which will sometimes effect a cure. If over-medication appears to be the cause of the obstinacy, the root should be filled and the result awaited. If the surmise is correct, a cure will be effected.

A trifling sensibility will sometimes remain about a tooth which is otherwise firm and well, in defiance of protracted treatment and a long period of probation. This is frequently caused by probing through the foramen in a careless moment and irritating the extreme parts, or, worse still, forcing a minute particle, more or less, through into the surrounding tissues. Of course this irritant can never be removed, and will remain there to cause a permanent though slight soreness and discomfort, if nothing worse. After treating and waiting a long time, the only thing to be done is to fill as usual, after being satisfied that no worse trouble will likely ensue.

Nodules in the pulp-chamber or canals are an occasional source of annoyance, or perhaps of great difficulty, in treating teeth deprived of pulps. If not removed at the time of extirpation, the drill is the only remedy. These masses frequently, perhaps, conceal the small canal.

Deciduous teeth are peculiarly amenable to treatment of this kind in pulpless conditions, and ordinarily require about half the time and attention that the permanent teeth demand. On account of having larger pulps and more open and permeable canaliculi, and the tissues being less dense and more organic than the permanent teeth, saturation is more readily accomplished, and a cure more easily effected.

Their time of life and service being of limited duration, the period of probationary filling can be shortened, and need not ordinarily be over two weeks. The permanent filling should usually be amalgam or tin, but in frail crowns the employment of os-artificiel will be indicated.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

THE following paper, entitled "Secondary Dentine," was read by the author, J. Morgan Howe, M.D.S.:

"The pulp of a tooth being deprived of a portion of its normal protecting wall, it has been observed that tissue analogous apparently to dentine has been deposited in the orifice, closing it entirely, and thus restoring the condition necessary to the preservation of the pulp. This result having occurred occasionally, it is important to know whether any one substance used as a covering has been more frequently followed by such deposits than when others have been used. Is the necessary amount of lime held in solution in the blood of all healthy persons? If so, how can the vital forces of the part be stimulated to make a reparative deposition, as is done when fractured bones are properly set and protected? Can this action be induced, or is it only necessary in order to obtain such deposits generally that the pulp should be freed from all irritating agents, and be protected by a wall securing it from foreign substances and abnormal thermal changes?"

Exposed dental pulps have always, no doubt, received a great deal of attention, but the effort of the dentist to save the organ alive, as well as to comfort the patient, has been of comparatively recent date. In presenting this result of some study of the writings of others, I shall hope, if I fail in throwing any light on the subject, that at least the perception and correction of my errors may illuminate the truth. In the effort to answer these important questions, a collation of the reports of conservative pulp treatment [all I have been able to find, stating method and results] may have some value. Dr. Leonard Koecker, in a work published in 1826, first advocated treatment for the "restoration and preservation of the life of this important part of the tooth;" he cauterized the point of exposure with a red-hot wire, and covered the part with a thin leaden plate, and then filled with gold; after a three-months' test, if the tooth had a "natural and lively color, and was free from pain, without being insensible or loose," he claimed success. His experience caused him to recommend this practice with confidence. Dr. C. A. Harris (*American Journal* *of Dental Science*), in 1849, reported having treated, during the previous three years, one hundred and fifty exposed pulps, using no caps, but arching the gold over the exposure; and, so far as he was able to ascertain, with success in about twelve out of thirteen cases. It was not observed, however, until 1850, that successful treatment was attended by a reparative deposition of dentine; in that year "this was distinctly claimed as the final aim by Dr. W. W. Codman, of Boston." "To excite ossification, as surgeons sometimes do to fractured bones when indolent," after protecting the pulp with cotton, he "occasionally removed it (the cotton) and lightly rescraped the bone." Twelve years' experience, he said, had proved that a healthy pulp, although wounded, will protect itself (*Boston Medical and Surgical Journal*). None have, so far as I know, adopted Dr. Codman's method; but by various means, this aim being more or less in view, many pulps have escaped destruction. In 1855 (*New York Dental Recorder*), Dr. J. Sanford, of Chillicothe, Ohio, reported thirty cases of exposed pulps treated with spirits of camphor, after which he filled with gold, and, from a carefully-kept record, he asserted that in every case he "saved the teeth." Thomas Rogers, M.R.C.S. (*British Journal of Dental Science*), in 1856–57, reported forty-eight cases in which he used a gold cap carefully adjusted over the exposed nerve and filled with amalgam; trial extended over four years; six had failed; seven-eighths were successful. Dr. J. Richardson (DENTAL COSMOS), in 1861, recommended oxychloride of zinc to cover pulps; tests for ten to twenty-one days before filling permanently. Dr. H. N. Wadsworth (DENTAL COSMOS), in 1862, recommended oxychloride as in most cases the best material for pulp-capping. Dr. C. H. Roberts (DENTAL COSMOS), in 1863, destroyed exposed pulps by "cauterizing with nitric acid" and filling over with oxychloride, and recommends it to save pain and subsequent ulceration.* Dr. W. H. Atkinson (DENTAL COSMOS), in 1868, said, "Cauterization is only a hurried form of nutrient activity," and recommended cauterizing the point of exposure with pure creasote, then dry the cavity, mix the oxychloride in a soft condition, and just before introducing it put a drop of creasote on the pulp to prevent actual contact of the oxychloride. Dr. T. B. Hitchcock (*Dental Register of the West*), in 1868, reported thirty-four cases treated with oxychloride, all of which, so far as he knew, were successful. Dr. I. A. Salmon (*Dental Register of the West*), in 1868, reported thirty-four cases treated by covering with a piece of fine linen, on which he put oxychloride mixed with no excess of liquid, and the latter of just sufficient strength to cause the mixture to set. In every case which he examined the tooth appeared alive and healthy. Dr. Charles L. Houghton (*Dental Register of the West*), in 1868, reported ninety-seven cases during two years, of which he kept a careful record, treated with oxychloride; "only three proved failures." Dr. C. E. Francis (DENTAL COSMOS), in 1869, suggested, as his own mode of practice, to cover the point of exposure with a piece of smooth note-paper and fill over this with oxychloride; this plan had been successful in his hands. His views seem to be condensed in his last sentence, "The less irritation produced, the more certain are the chances of success." Dr. H. S. Chase (editor *Missouri Dental Journal*), in 1869, noted a result of oxychloride over exposed pulps in several cases where it had been in several months, and had given no trouble. On removal, it was discovered that the pulps were dead and gone. Dr. G. B. McDonneld (*Dental Times*), in 1870, had come to the conclusion, from experience, that with oxychloride ninety out of every one hundred pulps, under favorable circumstances, can be saved. Dr. J. S. Smith (*Missouri Dental Journal*), in 1870, reported his experience that probably two-thirds of all cases treated with oxychloride are successful. Dr. H. S. Chase (editor *Missouri Dental Journal*), in 1870, said, saving the pulp alive by the use of creasote and oxychloride has been proved to be a success. Dr. W. H. Trueman (DENTAL COSMOS), in 1870, recorded the fact that several cases of the death of the pulp have come under his knowledge when oxychloride had been inserted in the cavity, "even where there was sufficient dentine intervening to be considered safe." Dr. T. B. Hitchcock (DENTAL COSMOS), in 1871, reported that to January, 1871, he had used oxychloride over exposed pulps in all one hundred and five times, and said that in six of these one hundred and five cases "I am positive of the death of the pulp;" his conclusions are thus stated: "I now use arsenious acid in many of the teeth having exposed pulps, which I should once have treated with oxychloride of zinc." Dr. A. W. Harlan (DENTAL COSMOS), in 1871, reported fifty-one cases of entire exposure treated during the previous two years with oxychloride, always testing six months with temporary filling. At the end of that time, in forty-nine cases, the "pulp was found in a sound and healthy condition." Mordaunt Stevens, M.R.C.S., L.D.S. (*British Journal of Dental Science*), in 1872, in an article advocating the use of lead foil over exposed pulps, said he was certain that "more nerves are killed than saved by capping with osteo-plastic." Dr. S. B. Palmer (DENTAL COSMOS), in 1872, expressed the opinion that oxychloride is well adapted for the purpose of covering pulps, on account of the protection it affords by absolute contact with the walls of the cavity. It is superior to Hill's stopping, but "cannot see that it has any real virtue aside from this in stimulating the pulp to perform its office. . . . Such fillings appear to impart antiseptic or embalming properties to a devitalized pulp to such a degree as to have obtained for this article an unwarrantable reputation for preserving it alive." Dr. Jas. S. King (*Missouri Dental Journal*), in 1873, recorded the discovery three years before of the thorough reliability of a covering of oxide of zinc and creasote mixed; he had had good success with it except in cases where inflammatory action was far advanced. Dr. J. E. Cravens (*Missouri Dental Journal*), in 1873, announced his experiment with soluble lactophosphate of lime; his idea being to supply the pulp with material with which to form the deposit, he lanced the exposed pulp "to facilitate admixture or solution." The result reported in one case was "a new growth of dentine of repair over the entire surface of previous exposure in nine days." Dr. Louis Jack (DENTAL COSMOS), in 1873, on exposures from caries that had continued for some time, said, "If we are to rely upon the investigations of the German observers . . . the dentinal cells over the exposed part are obliterated, the connective tissue has suffered proliferations, the blood-vessels are altered by serious structural changes . . . in short, all the structural elements of the pulp have undergone change" (Wedl). If there is effusion of lymph or pus, he would treat with aconite, or solution of chloride of zinc, followed by aconite; then cover the part with gold-beaters' skin dipped in carbolic acid ten to fifteen per cent. (menstruum of glycerin), with no excess of the dressing. Over this he places a disk of tin dipped in a solution of gutta-percha. "My experience," he says, "in this class of exposures has been far from satisfactory. Of sixteen cases under treatment within two years, six have been total failures; two are in an unsatisfactory condition; the remaining eight are, as far as reported, in an entirely comfortable state . . . unless more satisfactory means will be pointed out, would incline to the solution of accepting immediate devitalization." Dr. C. E. Francis (DENTAL COSMOS), in 1873, recommended capping with a piece of note-paper, on one side of which is spread balsam of fir dissolved in chloroform; this side to be applied to the pulp, and over this oxychloride. The latter he considers purely mechanical in its good offices, and, without an impervious agent between it and the pulp, "is likely to do more harm than good," it "endangers the vitality of any pulp that it touches." Dr. T. C. Stellwagen (DENTAL COSMOS), in 1873, criticised the practice of writers of allowing the local treatment to monopolize their attention. "The important considerations of the general system, its ability to withstand irritation, the greater or lesser tendency to inflammatory action, the proper antiphlogistic regime to be regarded, and the consequent prognosis that should always be formed, are neglected." He advises those that wish invariable rules to extirpate every exposed pulp rather than to indiscriminately cap all; and suggests the use of thin slices of periosteum or cartilage. He says he has had more favorable results from the trial of Dr. Francis's method than from other means, and includes a table of results of pulp treatment, but there is no reference to material used nor to mode of treatment. Dr. H. L. Sage (*Dental Register*), in 1874, in a paper on this subject, reported that since December, 1868, he had treated pulps with creasote or carvacrol, and capped with oxychloride, as follows: capped pulps, 204; exposed, 176; nearly or doubtful, 28. Of this number he afterwards tested and found living, 77. He did not test 112. In four cases treatment was followed by abscess, and in eleven cases they would not tolerate capping. Dr. A. W. Harlan (*Missouri Dental Journal*), in 1874, recommended the use of basswood paper soaked in creasote, to be placed over the pulp before applying oxychloride. Dr. J. E. Cravens (*Missouri Dental Journal*), in 1874, reported favorably on the further use of lacto-phosphate of lime, both by himself and others. Dr. E. C. Moore (DENTAL COSMOS), in 1874, recommended isinglass plaster, made soft and moist, to be used over the pulp before applying oxychloride. Dr. J. E. Cravens, in a paper read February, 1876, before the New York Odontological Society, expressed continued confidence in lacto-phosphate of lime as a pulp-dressing, and that it is assimilated into the pulp. Dr. W. S. Elliott (*Johnston's Dental Miscellany*), in 1876, expressed entire confidence in the treatment of healthy pulps with creasote, the use of which "causes a pellicle of fibrin to be formed," which, it seems, he considers the protector of the pulp, and also "becomes the framework or matrix of the new structure." After thus applying creasote he fills with oxychloride. Dr. J. Foster Flagg, in "Dental Pathology and Therapeutics" (DENTAL COSMOS), gives his testimony adversely to the use of oxychloride over exposed pulps.

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* This use of oxychloride is inserted here as a curiosity in the history of the use of this material.

All these reports refer only to success or failure, judged by such symptoms as might be observed by the patient or dentist; or at most by tests for vitality applied to the teeth; it cannot be said therefore that they prove anything, as to secondary deposits of dentine, as a result of any treatment or covering. What proportion of saved pulps thus protect themselves it would be impossible to determine, but the nature and function of the organ, as well as frequent exhibitions of the deposit, warrant the statement that a very large proportion are protected by a secondary deposit. With some allowance then for differences in the use of language in regard to what should be called an exposure of the pulp, and also for differences in opinion and diagnosis as to what constitutes success, we may form some conclusion. As oxychloride of zinc has been used for a pulp-covering, according to these reports, almost to the exclusion of other materials, and as the preponderance of success as reported is so great, we may conclude, even after making the allowances referred to, that secondary deposits of dentine have occurred more frequently after the pulp has been covered with this material than after the use of any other one substance. Nevertheless, the powerful irritant qualities of this material, and the discovery that pulps have apparently by its influence been destroyed, even under a protection of more or less dentine, and also the occasional discovery of a tenantless pulp-chamber under this capping, when no symptoms caused suspicion of such a fact, have led some to distrust its efficacy. Dr. C. E. Francis, in 1869, was the first to question the propriety of allowing it to come in contact with the pulp, and there seems to be at present a growing disposition to heed the caution and interpose other material. Some have believed that success was the result of both its irritant and mechanical properties, but it seems to me reasonable to suppose that when *survival has occurred it has not been induced by, but notwithstanding, the irritation, and is only proof of recuperative power.*

The material for the building up of this new formation must of course be supplied by the blood; but a doubt is suggested, whether a lack of lime in the blood may not prevent this deposit from being formed: as if we said, the pulp and its cells are ready and willing, but the material is not at hand.

Prof. Flint says that the phosphate of lime is hardly second in importance in the body to water, and it is found in all the solids and fluids thereof; in the latter it is held in solution "by virtue of free carbonic acid, the bicarbonates, and the chloride of sodium." He gives the proportion contained in the blood at from .76 to .79 of a part per 1000, while Prof. Dalton gives it at .30 of a part per 1000. In both animal and vegetable food lime salts are found among the most common of their constituents, being in a condition of intimate union with nitrogenized principles; thus they pass through the elaborate process of digestion and become a part of the blood.

Dr. Carpenter says of the albumen of the blood, "It is the original pabulum, at the expense of which all the solid tissues are generated," and its great function is "to supply the material for these various transformations, and we accordingly find that whatever other changes the fluid may undergo, whether it loses its fibrin, or its red corpuscles, or both, albumen is still present in abundance." And again he asserts that the various inorganic compounds "are uniformly present in the blood, and must be considered as among its integral constituents."

Prof. Flint says of albuminoid matters, that "they constitute the great nutritive nitrogenized principles of the blood, in combination with which the phosphate of lime always exists in the body." These statements would seem to leave but little reason to doubt a full supply of lime in normal blood, but we will follow the inquiry further. Inorganic principles in the system are found to be always united with organic matter, and this union is "so intimate that they cannot be completely separated without incineration;" thus united, they accompany each other "in all of their so-called vital acts," serving all of the purposes of nutrition, and when the organic parts become effete, or are transformed into excrementitious substances, they are always thrown off in connection with the mineral substances which enter into their composition." These inorganic substances are then found in the excretions unchanged in character, although the substances with which they have been united have been subjected to many changes (Flint); the quantity, however, found in the excretions seems to be considered as too great to be derived only from effete matter thrown off by the tissues. Prof. Flint ascribes a portion to excess taken with the food, and refers, in the same connection, to the ability of the kidneys to relieve the system of a surplus of inorganic matter introduced into the circulation; and on this point Dr. Carpenter says that "the normal proportion of all these (inorganic) substances appears to be maintained by means of the excretory apparatus which filters off (so to speak) any surplus." On this testimony we must consider the variations in the quantity of inorganic matter in the blood as at least most likely to occur in the direction of excess rather than the opposite; but we will inquire further.

There is little doubt that the organic nitrogenized elements in the organism give to the parts their characteristic functions which are called vital; but as these constituents are and must be combined with a tolerably definite quantity of inorganic matter, the latter "regulates to a certain extent nutritive processes" (Flint), and "serve by their presence to enable those changes to take place in the other constituents of the body which are indispensable to nutrition" (Dalton); lime salts and other inorganic substances, in this view, come to be the representatives of health, or the performance of function. *We cannot then suppose such a condition in a healthy system, as that the tissues and cells are capable of appropriating material which they cannot obtain*, and the cause of imperfect ossification is, accordingly, not referred to lack of material in the blood, but to a want of the power of assimilation (Dalton); and whenever there is evidence of lack of inorganic matter in the tissues, the application of remedial measures to restore vital energy to the system, or in other words to restore the ability of cells to appropriate pabulum, should accomplish the desired result.

If we could suppose it possible for a part to appropriate inorganic material, applied locally, without the apparently necessary union of organic matter which has passed through the elaborate preparation of digestion, we should still be unable to believe that appropriation of such material, locally applied, would take place, because *ability in the tissues necessarily implies a supply of the material in the blood*, and a system, or a part, could not be considered sufficiently healthy to make a reparative deposition if there was known to be a lack of inorganic matter in the organism. The application of lacto-phosphate of lime to exposed pulps, as recommended by Dr. Cravens, may prove to be the best treatment for the purpose of securing a reparative deposit of dentine; but if so, there would be in that fact no proof that the pulp has made use of the material so applied.

Dr. Carpenter, on the reparation of losses of substance from injury or disease, says, "In its most perfect form this process is exactly analogous to that of the first development of the corresponding parts." The power of parts to take up matter, to sustain existence, or to repair loss from injury, Virchow calls "nutritive irritability;" a state of irritation is more or less abnormal according to its degree, and is the first stage of inflammation. Dr. J. Foster Flagg says, "Lesions of vital tissues produce irritation, and that irritation, within certain limits, induces increased vital action, which," he says, "is manifested by exalted sensibility, increased circulation, and increased nutrition."

Dr. C. Wedl, on reparative deposits of secondary dentine, says, "It is evident . . . there occurs a continued development of dentine, within certain limits, determined by an irritation." And again he says, "Dentinal new formations, which are developed upon the wall of the pulp-cavity at a point corresponding to the carious locality in the dentine, can be induced only by an irritation in the contiguous portion of the pulp; they are an expression of the efforts of nature . . . to compensate for the peripheral destruction." Mr. S. J. A. Salter asserts (and it would seem amply corroborates the statement) that the peripheral extremities of the dentinal tubuli are no sooner exposed to irritating influences than the pulp commences the process of repair at that portion of the pulp-cavity corresponding to the inner termini of the exposed tubules. "The dentine (he says) is a living tissue capable of receiving impressions and of propagating them to a proximate organ, which legitimately has the power and the office of restoring it." *Irritation, then, is the stimulus* which causes the "vital forces of the part" to make the "reparative deposition;" within certain limits it induces reparative processes, but the amount necessary is shown by Mr. Salter to be very small, and we may conclude that by the time the pulp has become exposed, the limit of irritation necessary to this process has been far exceeded; nevertheless, some have believed that a renewal of formative activity would be induced by irritating an exposed pulp. Dr. Flagg, although he does not indorse the practice, says, "It is not always the case that an application for capping a pulp is objectionable in consequence of irritating attributes," and he has minutely described the differences of susceptibility to irritation in different persons. The writer has covered exposed pulps with oxide of zinc and creasote, and with paper, which, after six months and a year of perfect relief from all unfavorable symptoms, have been found, on removing the covering, although apparently healthy, as fully exposed as when first treated. In these cases it is possible that irritation would induce the deposit of dentine, but fear that oxychloride of zinc would irritate more than was needed and result in destruction of vitality, has prevented me from applying it.

Virchow says of "nutritive irritability," that upon a sudden change in the condition, or "when the process runs a particularly acute course, a weakening of the parts sets in, proceeding to a complete destruction of it," and this process, inflammation, may, I think, be said to be threatening in every case of exposed pulp.

I should conclude that irritation, if not in every case unnecessary, is so in nearly every case, and *is always dangerous*, and that (except perhaps with very rare exceptions) an exposed pulp is better treated than in any other way *by removing from it all irritating substances, and protecting it with such material as will neither irritate nor permit irritation from external influences*, and that the expectation would be well grounded that there would still be sufficient of *nature's stimulus* to induce a renewal of formative activity in the pulp.

Dr. Flagg says, "Just in proportion as I have succeeded in *preventing* 'recuperative irritation' (?) so have I had promise of success."

Intelligent systemic treatment may do much toward modifying morbid conditions of pulp, as well as of other tissues, and it is I think destined to be considered more and more important in dental practice. A correct diagnosis of patient and pulp is all-important in deciding to treat conservatively or otherwise. The ideal dentist will always succeed in saving exposed pulps, for he will have the skill to select only such for conservative treatment as have the "promise and potency of life." To make such diagnosis in each case is probably the most delicate test of enlightened judgment that could be applied. How the dentist shall be prepared for such a test, is a question for those who are discussing our professional education.

Dr. E. A. Bogue. I should like to ask Dr. Howe if he has come to any conclusion as to whether secondary dentine is ever formed when the peripheral cells of the pulp are gone, whether through excision or superficial ulceration? I mean that portion that is sometimes treated of as the lining membrane of the pulp-chamber.

Dr. J. M. Howe. I had in my paper some reference to calcified tissue formed in the pulp-cavity after the destruction of the dentinal cells, or their supposed destruction, or of the periphery of the pulp itself; but I found the paper would be so long that it must be omitted.

I have formed the conclusion that secondary dentine of repair is never formed under such circumstances, and that, for the purpose of protecting an organ which shall perform functions, treatment after such a condition has been arrived at is useless. From a study of Salter and Wedl on that subject, I have come to that conclusion. I think that secondary dentine of repair is only possible in a healthy pulp, one in which the peripheral dentinal cells have not been destroyed. Therefore, my conclusion would be that the treatment of these pulps which have been lacerated, and from which portions are removed, would be useless.

Dr. E. A. Bogue. I want to express my thanks to Dr. Howe for that answer, which I consider not only clear but eminently sound, so far as I am able to understand it.

Dr. W. H. Dwinelle. I did not hear the whole of Dr. Howe's paper read, but so far as I did it has my hearty approval. It gratifies me that this subject is up. It certainly is one of the most interesting before our profession at the present time. It has been a hobby with me all my professional life to advocate the restoration and preservation of the vitality of the teeth.

Dr. A. H. Brockway. I have heard no allusion here to the use of Fletcher's artificial dentine, which is put forth as the proper material for this purpose. I have used it in quite a number of cases for capping exposed pulps, and, so far as I recall, without a single failure. I don't know that it has any advantages over oxychloride of zinc mixed with creasote, but it is not irritating.

Dr. E. A. Bogue. Fletcher's artificial dentine is, I believe, a hydrochloride of zinc. The fluid, instead of being chloride of zinc, is gum-water and creasote, or carbolic acid.

There is a point of similarity between the answer of Dr. Howe to my question and the subject we had up at our last meeting, and I would like to mention it. Dr. Howe answers substantially that he does not believe that it is expedient to undertake to save a pulp alive when the peripheral cells are gone, whether from excision or suppuration; and it will be noticed that cemental growth takes place conversely.

It has been stated by some that when teeth are replaced in the sockets they obtain their firmness through the deposition of cement around the roots somewhat in the same way that exostosis takes place; that those cemental cells do their work provided the periosteum remains in the socket into which the tooth is placed; but that if, in the extraction of the preceding tooth the periosteum happens to be torn out, there will be no deposition of cemental cells, and consequently there will be no attachment, and that sooner or later a failure will result.

The paper read at the last meeting uses, I think, the word "anchylosis," and states that the mode of union between the tooth and the socket is anchylosis. Tomes states that this has never been observed in the human jaw. I confess I do not see how it can be.

But I rose to call attention to the similarity of condition that exists between this matter of transplantation and the proper condition of the socket for that purpose, and this matter of pulp-preservation and the proper condition of the pulp for an attempt to be made at its preservation.

Dr. W. S. Elliott. Has Dr. Brockway tested Fletcher's material to learn its chemical reaction?

Dr. Brockway. I have not.

Dr. W. S. Elliott. It is an important consideration, I think, that we should not use any agent possessing a decided alkaline reaction, since the fluidity of the blood is maintained by its own alkaline constituents, and the further application of any material having such properties would tend to prevent the deposition of the structural elements upon which we must depend for the formation of new pulp-tissue.

Reference is usually made to the material used as a "covering" for the exposed pulp to protect it from undue influence. It seems to me that the philosophy of the preservation of the pulp is not sufficiently comprehended. Nature should supply its own covering, which must be eliminated from the vitalized elements of the organ. But in order to institute the reparative process a displacement of the constituents of the blood is necessary to establish the first step in the process of reparation. I would therefore incise the pulp (if there is not already a traumatic lesion) to favor the effusion of lymph, and then make application of creasote to excite the further deposition of fibrin, and thus to make pronouncement of the initial step towards complete restoration of structure. The alkaline salts are held more feebly by the fibrin than by the other constituents; therefore, so far as chemical action is concerned, the fibrin is first deprived of the property which favors its fluidity, and as this is the constituent upon which the complete normal tissue is built, we are especially favored by the results.

It would seem to appear, then, that it is not a mere artificial covering that is required to shield the pulp from external irritation; protection must be evolved from the forces which influence vital action within, and the material must be drawn from nature's own laboratory.

This, it appears to me, is the philosophy concerning the treatment of the pulp, in which I am confirmed through the study of physiology and pathology.

Q. Will you relate your method of treating an exposed pulp?

Dr. Elliott. First free the cavity from *débris* as thoroughly as possible; if the pulp is exposed, I prefer to bleed it. Cauterize with wood creasote until the bleeding is arrested, then fill with oxychloride of zinc.

Q. Covering directly with oxychloride of zinc?

A. Yes, sir.

Q. Not introducing creasote and oxide of zinc?

A. No, sir. I have no objection, however, to that method, nor am I particularly partial to the oxychloride of zinc as a filling. Other materials will meet the indications. I do not depend upon the oxychloride of zinc as the preserver of the pulp; I only look upon it as a convenient agent in filling the cavity and opposing the septic influences within the dentinal tissue in remoter parts of the cavity.

Q. Have you anything like a record of cases?

A. My record is quite full, but I could not bring it down to figures. I never attempt to save a pulp that I consider so far below par in vitality that it will not respond normally to the treatment.

Q. Would you wound a pulp without any previous pain or excitement in it?

A. I would. Though there may be no pain, there may be determination of blood, if not congestion; incision will provoke the elaboration of fibrin.

Dr. Bogue. Will Dr. Elliott tell us where the line is at which he would decline an attempt at pulp-preservation? Can it be described to us so that we may know?

Dr. Elliott. Of course it is impossible to define the line so sharply. In diagnosing a case our attention is not only drawn to the local features, but we must consider attending circumstances; the health, temperament, etc., of the patient, and intuitively almost do we arrive at a probable prognosis. In cases which have proved unsuccessful, I have generally found sufficient cause which was independent of the principles upon which the treatment was instituted.

Dr. Bogue. Do I understand that the depletion of the pulp is invariably practiced on the theory that the pulp at that time is necessarily congested?

Dr. Elliott. No, sir. Only that I would consider that it would do no harm to bleed the pulp, even though it was not congested.

Dr. Bogue. Even though it were perfectly well?

Dr. Elliott. Yes, sir. But I can hardly conceive that a case would present itself without a degree of determination or congestion.

Dr. Wm. Jarvie, Jr. Some time ago, Dr. Elliott stated as his practice, that in cases where there was quite a thin stratum of perfectly sound dentine over the pulp, he would remove that dentine and bleed the pulp. I would like to ask if Dr. Elliott pursues that practice yet?

Dr. Elliott. I think that in the way which the doctor puts the question he somewhat forces the conditions, because when we have quite a thin stratum of dentine over the pulp I can hardly consider it in a normal condition, and either it or the filling would in time affect the pulp adversely. I prefer to expose the pulp, and institute the treatment referred to.

Dr. Jarvie. And under those circumstances bleed it?

Dr. Elliott. Yes, sir.

Dr. S. G. Perry. After applying the oxychloride of zinc, and allowing it to harden, then you fill permanently?

Dr. Elliott. Yes, sir.

Dr. Perry. Do you never test the tooth after, say six months?

Dr. Elliott. I do not deem it particularly necessary. If the philosophy of treatment is correct, the cases will do well. If failure is the result, the patient will seek your further services. I note more dead pulps resulting from the irritation of fillings over a thin stratum of dentine, than when the pulp is treated in the manner stated.

Adjourned.

GEORGIA STATE DENTAL SOCIETY.

The ninth annual meeting of this society convened in the hall of the Young Men's Christian Association, in Macon, May 8th, 1877; President Dr. L. D. Carpenter, of Atlanta, in the chair.

The following papers were read:

"Therapeutical Treatment of Dental Organs," by Dr. J. H. Coyle, of Thomasville.

"Mechanical Dentistry," by Dr. Geo. W. McElhaney, of West Point.

"Operative Dentistry," by Dr. J. M. Mason, of Columbus.

"Facial Neuralgia," by Dr. W. C. Wardlaw, of Augusta.

"Experience and Treatment of Tetanus caused from a Diseased Dens Sapientiæ," by Dr. E. Parsons, of Savannah.

Dr. Chapple opposed the popular practice of fang-filling, particularly fangs of posterior teeth, thirty cases of *non*-fang filling having disproved, he thought, the fallacious idea of the formation of gases, etc., in the fang.

A universal sentiment prevailed regarding gold as a base preferable to any other. Celluloid was being less appreciated, and hence less employed.

Dr. Thomas expressed regret at seeing a disposition upon the part of some of the profession to ignore mechanical dentistry, and a willingness to leave it to quacks and charlatans, which not only results to the injury of the public, but brings the operative branch into disrepute.

The Maryland Dental College, of Baltimore, having announced to the society their willingness to receive a beneficiary student elected by this society, Mr. A. S. Moore was recommended and elected, with Mr. Chidell as an alternate.

The following officers were elected for the ensuing year:

President.—Dr. M. H. Thomas, of Crawford.

First Vice-President.—Dr. J. A. Tigner, of Columbus.

Second Vice-President.—Dr. J. L. Fogg, of Barnesville.

Recording Secretary.—Dr. J. A. Chapple, of Lagrange.

Corresponding Secretary.—Dr. M. S. Jobson, of Perry.

Treasurer.—Dr. H. A. Lowrance, of Athens.

State Executive Committee.—Dr. A. C. Ford, of Atlanta; Dr. W. C. Wardlaw, of Augusta; Dr. E. Parsons, of Savannah; Dr. J. H. Coyle, of Thomasville; Dr. G. W. McElhaney, of West Point.

STANDING COMMITTEES.

Physiology and Histology.—Drs. W. C. Wardlaw and E. Parsons.

Dental Pathology and Surgery.—Drs. J. H. Coyle and R. H. Holliday.

Chemistry and Therapeutics.—Drs. D. P. Holloway and R. B. Adair.

Operative Dentistry.—Drs. E. M. Allen and M. S. Jobson.

Mechanical Dentistry.—Drs. L. D. Carpenter and G. W. Whittaker.

Dental Education.—Drs. W. R. Holmes and J. M. Mason.

Arrangements.—Drs. Samuel Hape and R. H. Holliday.

SPECIAL COMMITTEES.

"What are the Conditions of a Tooth which justify its Extraction?" Drs. J. P. Holmes and J. A. Hart.

"What is the Best Treatment for Exposed Nerves and Abscess?" Drs. R. H. Holliday and S. Newman.

"Filling Teeth and what Material to Use," Drs. A. C. Ford and R. B. Adair.

"Can the Decay of Teeth be Prevented?" Drs. E. E. Parsons and H. A. Lowrance.

"Dentistry as a Profession," Drs. G. W. McElhaney and J. D. McKellar.

"The Arrangement of Dental Offices in regard to Health and Convenience," Drs. D. Smith and J. A. Tigner.

Delegates to the American Dental Convention at Deer Park, Maryland, *in August.*—Drs. L. D. Carpenter, J. P. Holmes, J. A. Chapple, W. C. Wardlaw, R. B. Adair.

The next annual meeting will be held in Atlanta, on Monday, July 29th, 1878. The time for meeting from May to July was changed in order that attending members might be present at the meeting of the Southern Dental Association, which convenes in Atlanta on Tuesday, July 30th, 1878.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

REPORTED BY THEODORE F. CHUPEIN, D.D.S.

A SPECIAL meeting of the above society was held on the evening of June 19th, at the hall of the Pennsylvania Dental College. In the absence of the president, the vice-president, Dr. E. R. Pettit, took the chair. The following delegates were appointed to serve at both the State and American Dental associations:

Delegates.—E. H. Neall, E. T. Darby, T. L. Buckingham, J. H. Githens, Amos Wert, E. R. Pettit, Spencer Roberts, T. F. Chupein, Joseph Pettit, M. L. Long, W. H. Trueman, C. J. Essig, and S. H. Guilford.

After the election of delegates, Dr. E. R. Pettit was requested to enlighten the association as to his electro-dental fan, a complete one mounted on a pedestal being present. Dr. Pettit entered into a description of it, its power, cost, expense, etc.

Dr. T. W. Buckingham presented for inspection some rubber dam clamps with posts or standards riveted to the flanges, for the purpose of stretching the rubber over these posts as an aid in the application of the dam. He said the idea was similar to that of those recently illustrated in the DENTAL COSMOS, as invented by Dr. Elliott, only that with Dr. Elliott's clamps a special pair of clamp forceps had to be used, whereas with these the ordinary clamp forceps would suffice.

There being no further business, the meeting adjourned.

KANSAS STATE DENTAL ASSOCIATION.

THE officers for the ensuing year of the Kansas State Dental Association are—

President.—J. D. Patterson, Lawrence.
First Vice-President.—J. K. Stark, Kansas City, Missouri.
Second Vice-President.—J. A. Young, Emporia.
Secretary.—Wm. H. Shulze, Atchison.
Treasurer.—L. C. Wasson, Ottawa.
Member Board of Censors.—J. B. Wheeler, Lawrence.

Next meeting at Lawrence, Kansas, the first Tuesday in May, 1878.

WM. H. SHULZE, *Secretary.*

AMERICAN DENTAL ASSOCIATION.

THE seventeenth annual meeting of the American Dental Association will convene in Chicago on Tuesday, August 7th, 1877.

Arrangements have been made with the proprietors of the Grand Pacific Hotel, by the executive committee, for hall and all committee-rooms in connection therewith. They have also made special rates for the delegates attending the convention. The regular prices of the hotel are from $3.00 to $5.00 per day, according to location of rooms, but the rates for delegates have been reduced to $2.50 per day for rooms without baths, and $3.00 per day for rooms with baths. Delegates will please notify the proprietors of the hotel, Messrs. John B. Drake & Co., by telegram or letter, at as early a date as possible, stating kind of room desired, so that it will be in readiness upon their arrival. COMMITTEE.

THE assembly- and committee-rooms for the use of the American Dental Association have been secured in the Grand Pacific Hotel, Chicago. Palmer House, regular rates $3.00 to $5.00, special $2.50 to $3.00;* Grand Pacific, regular rates $3.00 to $5.00, special $2.50 to $3.00;* Tremont House, regular rates $3.00 to $4.50, special $2.00 to $2.50; Sherman House, regular rates $3.00 to $4.50, special $2.50 to $3.00;* Clifton House, regular rates $2.50, special $2.00; Matteson House, regular rates $2.50, special $2.00 to $2.50.*

M. S. DEAN, *Chairman Local Committee of Arrangements.*

JOINT MEETING.

THERE will be held at Deer Park and Oakland, Garrett County, Maryland, on the second Tuesday in August, a joint meeting of the American Dental Convention, the Southern Dental Association, and the Dental Association of the State of Maryland and District of Columbia. Members of these associations are expected to attend, and an invitation to be present with us is most cordially extended to members of other dental associations, members of the dental and medical professions, and all others interested in dental affairs. We expect to make arrangements with the different railroads for reduced rates of travel.

R. B. WINDER, *for the Executive Committee.*

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* Prices to which the star is affixed include bath-rooms. In all other cases rooms with baths are fifty cents extra.

AMERICAN ACADEMY OF DENTAL SCIENCE.

The tenth annual meeting of the American Academy of Dental Science will be held in Boston, on Monday, September 24th, 1877, at ten o'clock A.M.

The annual address will be delivered at two P.M., by Dr. Wm. H. Dwinelle, of New York.

GEO. T. MOFFATT, *Corresponding Secretary.*

WISCONSIN STATE DENTAL SOCIETY.

The annual meeting of the Wisconsin State Dental Society, for 1877, is by mutual consent put over until the usual time of meeting next year.

By order of the officers of the society and the executive committee.

NORTH CAROLINA DENTAL ASSOCIATION.

The third annual meeting of the North Carolina Dental Association will be held in Raleigh, N. C., on Tuesday, September 4th, 1877.

Members of the profession are cordially invited to attend.

The following are the officers of the North Carolina Dental Association:

President.—Dr. V. E. Turner.
First Vice-President.—Dr. J. W. Hunter.
Second Vice-President.—Dr. E. L. Hunter.
Secretary.—Dr. D. A. Robertson.
Treasurer.—Dr. J. H. Crawford.

D. A. ROBERTSON, *Secretary.*

BIBLIOGRAPHICAL.

FRUIT AND BREAD, A SCIENTIFIC DIET. By GUSTAV SCHLICKEYSEN. Translated from the German by M. L. Holbrook, M.D. New York: M. L. Holbrook & Co., 1877.

This is an attempt to prove by embryology and comparative anatomy that man is naturally frugiverous; that animal food of all kinds is more or less injurious; that cooking is, as a rule, an unnecessary and hurtful operation, and that fruit and bread constitute a scientific diet which answers all the requirements of nature.

The arguments adduced are far from being conclusive, and are, indeed, often puerile; the treatment of the subject is vague and discursive, and the book is altogether a good specimen of the purer class of those productions which emanate from the pens of so-called reformers.

The translator's work is done indifferently well, the style being stiff, ungraceful, and occasionally obscure.

OBITUARY.

DR. J. J. ANDERSON.

At the semi-annual meeting of the Connecticut Valley Dental Society, held at Greenfield, Massachusetts, June 12th, 1877, the death of Dr. J. J. Anderson, of Springfield, Massachusetts, was announced, and resolutions were unanimously passed expressive of the high esteem in which he had been held by the society as a man and a dentist.

PERISCOPE.

Notes upon Salivary Calculus.—*Gentlemen:* You have just seen, with me, a case of *stone under the tongue.* I use this term, though a little unscientific, since I propose to give you a complete history of those productions which are usually designated salivary calculi.

But first I must explain the case before us.

This patient was sent to me by my colleague, Dr. Frémy, whom this man, a merchant, had consulted some days before. He says this affection began in June, 1870, by a pain under the tongue while eating, and being uneasy about it he tried to find out the cause, first with the tip of his tongue, then with the finger he distinctly felt a tumor on the floor of the mouth. A doctor who was called, prescribed a leech, applied locally, which brought some relief, but only for a few weeks; for in August he again felt the same pain, accompanied this time with a tumefaction of the submaxillary region, which was dissipated by the use only of discutients and cataplasms.

During the war he entirely forgot these phenomena, but in 1871 he again felt these pains come suddenly, and with a noticeable swelling of the submaxillary region. The acute symptoms soon disappeared, but the enlargement under the tongue remained. During the next four years the patient felt no sort of constraint nor pain. It is said, gentlemen, that pathological affections produce continuous symptoms. Notice, however, calculi, and among them the salivary calculi. The symptoms by which they reveal themselves are nearly always remittent, and the proposition, therefore, made in general terms, includes an error. However that may be, after this long quiet, in 1875 the patient felt new pain and new difficulty in mastication. He then applied to Dr. Frémy, who sent him to me, and I at once recognized a stone under the tongue. The phenomena presented are, first, the constriction and pain. When he speaks he quickly feels a painful sensation under the tongue, especially in pronouncing certain words containing lingual consonants. He suffers, also, in eating. But remark, that this pain is not under the jaw, like that which indicates a retention of saliva, causing a distention of the submaxillary gland. This phenomenon, which we see in many cases, is wanting in this one, and the pain and constriction which accompanies eating and speaking is seated under the tongue. They ought, then, to be related to a purely mechanical trouble in the functions of the tongue.

Besides, the pain spreads sometimes to the four inferior incisors and to the corresponding parts of the lip.

Physical examination shows in the left sublingual furrow a long tumor, extending from the symphysis of the chin to the most distant part of the floor of the mouth. It pushes the tongue upwards and to the right, and Wharton's duct is deviated. It is covered with the mucous membrane, which is red and injected. Nothing can authorize, however, the assertion of Haller, a learned man, but not a surgeon, that this vascularization of the mucous membrane was the cause at the time of the operation of abundant hemorrhages. The explanation of this manifest error should be found in some accidental complication which presents itself in a given case.

The tumor is hard, neither elastic nor fluctuating; the mucous membrane is attached directly upon it, without any interposition of liquid; we can assure ourselves of this by placing our finger on it in the mouth and another finger under it in the subhyoïdean region. Finally, in exploring the mucous membrane with a pin, we are soon arrested by an absolute, calcareous, strong resistance. What are the relations of this tumor with Wharton's duct? Placing the patient in a strong light, exploration with a very-fine probe proved the existence of something in this canal. Scarcely had my probe entered when I felt a special sensation analogous to that in touching a vesical calculus, a sort of mucous friction, which you felt also. It is thus certain that our stone is in this duct.

What, now, is this concretion? A celebrated surgeon, in a theory to which I shall return, has assigned, as the origin of these stones, the production of calcareous deposits in the cavity of a ranula. But you see that the ranula is not developed at the expense of the excretive duct of the submaxillary gland. It is not a cretaceous deposit in a ranula with which we have to do, but a tumor really developed in Wharton's canal, a real salivary calculus; unless, indeed, it may be produced outside the walls, and there is consecutive ulceration. But this hypothesis, unlikely *a priori*, is not justified by any fact.

But how is it that so large a tumor has not arrested the flow of saliva? When we see a simple inflammation of buccal mucous membrane, caused by aphthæ or thrushes, it is characterized by swelling of the gland. Here we are astonished to find nothing of the kind, and to see, after some former unexpected symptoms of retention, four years elapse without the least accumulation of saliva behind the calculus. Perhaps—but this is a simple hypothesis—the calculus is canaliculated; perhaps—and I shall cite to you some examples of this kind—it presents upon the surface grooves or furrows which permit the saliva to flow.

Finally, gentlemen, I ought to explain the intervention necessitated by this affection. What shall we do to relieve the patient of his calculus, and so of his pain? Sir Astley Cooper, in a like case, divided Wharton's canal with a cataract needle as far as the calculus, and drew it out with forceps. Nothing is easier; but why encumber ourselves with a manual operation which serves no good purpose? Is it not simpler to cut directly down upon the calculus, and extract it by this large opening? I search in vain for the advantages of Sir Astley Cooper's procedure. It appears to me, on the contrary, to present the inconvenience of an incision of the canal much extended and more difficult of performance. The abnormal orifice exists in each case alike; and, moreover, what are the difficulties? It thus appears to me useless to complicate, at pleasure, a manual operation. I shall incise the mucous membrane over the calculus, following its long diameter, rock it in its place to loosen it, and withdraw it with forceps; and this operation is so simple as not to need the use of chloroform or after-treatment.

You have seen, gentlemen, how simple the operation is, and it has proved that the cavity was entirely free of liquid. The mucous membrane was thickened to nearly one-sixteenth of an inch, and you can comprehend how long a spontaneous ulceration would be in becoming established, and how difficult would be expulsion through such a fistula.

I was obliged to enlarge my incision, and, with a fluted sound, I rocked it, not without some pain, because it was very adherent. You see it is grooved, and these grooves were filled with the folds of mucous membrane, as we see calculi in the bladder sometimes fixed between the laminæ of that organ. After the operation there was no escape of liquid. Since then, a slight sore throat has developed, but without connection with the operation, and the orifice is already contracted. To assure my diagnosis, I have introduced Nos. 1 and 2 of Bowman's probes, found the pouch open, and no other calculus in it.

What becomes of the wound? The reports upon this point are silent. The patients relieved of their calculus go away, are not followed up; but our patient will return from time to time, and we shall be able to see whether either the pouch or the canal becomes closed, or, on the contrary, whether a permanent fistulous tract remains. . . .

To complete these etiological inquiries, we must ask what can be the direct cause of these concretions. The saliva contains normally but a very small proportion of mineral salts, and we should suppose that it was not at the expense of these that the concretions were formed. And yet this conclusion is erroneous, as I shall show presently. It is these salts which furnish the development of these calculi, but often a foreign body determines the situation and forms the nucleus of the concretion.

In fact, these calculi are often found in the herbivora, and almost always in an elongated form, as in their center we find habitually a barb of oats or a like body. In the case of an elephant who died at the menagerie in 1817, they found a grain of oats in the center of the calculus. In man it is sometimes the same.

In a case of Sequignol's a splinter of wood had determined the place of formation, of which it was the center, and the question was of a calculus in the duct of Steno.

In Delery's case the man had eaten a trout, and the next day felt a constant, acute pain. Some time after they extracted a hard body,—a sort of irregular pill,—the center of which was a fish-bone.

Here, as in the bladder, the smallest body surrounds itself with saline deposit. These bodies pass along with the liquids which fill the natural cavities of the body, a phenomenon so often observed in the waters of springs rich in calcareous salts, where the objects placed therein become the nucleus of rapid petrifaction.

The chemical constitution proves still more their origin. Analysis of some of them has shown from sixty to sixty-five parts of calcareous phosphates, and from twenty-five to thirty parts carbonate of lime; and you know that these salts exist normally in the saliva.

Pathological Anatomy.—A complete study of the anatomical arrangement which salivary calculi present to our view is contained in a curious case related by Closmadenc.

A man had died at Bicêtre in the service of Dr. Delasiauve, to whom Closmadenc was then intern.

This man had a tumor under the tongue which had been discovered during life. They raised the tumor, and having opened the salivary canal its whole length, they found encysted in a lateral dilation an oval-shaped calculus weighing forty-five grains. Upon the flattened sides they found two grooves,—two canaliculi running longitudinally,—which had permitted the saliva to flow over the sides of the stone, and, thanks to this disposition, there was no retention of saliva. However, the gland was double its normal size; but behind the pouch which inclosed the calculus the canal was not dilated, but presented a normal caliber, and, *en passant*, this fact was quite sufficient to ruin the theory of Louis, according to which the ranula was due to an accumulation of liquid in Wharton's duct. The pouch inclosed not one drop of liquid.

That which Closmadenc had found upon the cadaver I have been able to show you by a real dissection made upon the living. The dilatation in which the calculus was situated inclosed no liquid, there was no salivary concretion, and, in short, we penetrated into this pouch containing the calculus by the natural orifice of the duct.

We thus see what has been said and done upon the subject of calculi in Wharton's duct; but does it exist in the gland itself? This, though very rare, has been observed twice, and cannot be doubted.

You can, among others, consult a case of Jobert's, who reports an example. Before I recall to you the principal features of this subject, I ought to say to you that these calculi are very often multiple. Sometimes they are placed one after the other in the canal, like beads on a string. In other cases they are agglomerated. Ribes has extracted ten from one canal, Drelincourt seven. Often they are seen two or three together, but never have they shown them to be in the gland. It was Jobert who, in taking out a calculus which had retreated, felt in the body of the submaxillary gland one of these concretions, which he extirpated above the hyoïdean region. Since then Dr. Terrier has presented an analogous case to the Surgical Society. Thus calculi may develop themselves in the salivary glands, though they may be less frequent than in the canal of Wharton, where they are usually seated at about three-eighths of an inch from the external orifice.

Finally, in a case without analogy, they have met in the gland a sort of lithiasis, that is to say, multiple concretions analogous to those which were observed in the uric diathesis.

These calculi are generally mammillated and irregular; and I have already said that they, sometimes, have cavities with two lateral trenches, which let the saliva run out. This opportunity was supplied in our case by the deep sinuses which allowed the irregularities of the surface to sink in them, and which explains its adherence to the mucous membrane, and the absence of retention of saliva, it finding its way out in consequence of these irregularities.

The parotidean calculi approach more nearly the spherical form, while those of Wharton's canal are olivary fusiform. Their weight and volume vary. The largest parotidean calculus which had been observed was extracted by Bassow, of Moscow, and weighed 270 grains; ours weighed 150 grains, and is the largest we have seen. It is one three-eighth inch long, and one five-sixteenth inches in circumference. Its color is grayish-yellow; sometimes it is darker.

Dr. Maisonneuve has seen one of a red brick color. This calculus has become cracked, and, as you can see, shows a pretty regular stratification. The concentric layers, of which it is composed, are formed one upon the other from a nucleus, at the side of which a harder point appears to be the origin of the formation.

As you see, it has no foreign body in the center; but permit me to found upon this point an hypothesis, probable on some considerations. Dr. Maude observed, a long time since, that the chemical composition of the tartar which incrusts the teeth was identical with that of salivary calculi.

Is there not here an indication which will allow us to believe that a fragment of this tartar accidentally introduced into the duct of Wharton might give birth to the formation of a salivary calculus? And in support of this idea, I ask you to observe that these calculi are found oftenest in those who care little about the cleanliness of their teeth, and I will add that these calculi are more frequent in the canal of Wharton, so much nearer to the dental vault than the canal of Steno.

This narrative, gentlemen, would serve for a point of departure in a research which might not be without interest.

I add, in terminating the pathologico-anatomical discussion, that a little fragment of this calculus was sent to Dr. Hardy, chief of the chemical laboratory, and contrary to our anticipation, and contrary to the fact most generally observed, the analysis showed that it was composed exclusively of carbonate of lime. This fact will be ultimately cleared up.

Symptomatology.—The example which you have under consideration, gentlemen, shows you that the patients themselves often perceive the presence of these calculi only when they have attained considerable size.

Our patient, in fact, discovered in 1870 a tumor, the size of an olive, and the same fact appears in most cases. This is because the accretion is slow, and it is some time before it becomes a cause of appreciable trouble. These are felt in the region of the tongue, or of the salivary gland.

It is particularly these last phenomena which attract the attention of the patients. They have been described by Dr. Dujardin, who was afflicted himself with a salivary calculus.

Most of the patients feel a pain in eating, at the angle of the jaw, and this is because mastication stimulates abundant afflux of saliva, and the excretion being restrained, accumulates, distends the gland and its ducts, and provokes a lively sensibility. Sometimes the patients relieve themselves by pressing on the submaxillary region, and so, evacuating the liquid by a jet, are relieved.

This occlusion and pain, in some cases, are reproduced at all meals; in others they appear irregularly. Meanwhile, under the influence of this repeated distention, the submaxillary gland becomes tumefied, congested, and the region becomes hot and somewhat inflamed. . . .

When these symptoms have continued for a considerable time, they sometimes are followed by inflammation. An abscess forms and opens spontaneously; oftenest under the tongue; sometimes in the submaxillary region; and the orifice of the canal is converted into a permanent fistulous opening by the presence of the foreign body. But sometimes we see the canal a long time dilating itself; it then appearing whitish and hard, sonorous to the touch of the probe, and finally, all at once, the walls of the canal sufficiently distended, open themselves and let the calculus fall out; for this whitish body was a calculus, spontaneous delivery. Such is the progress and termination, in some sort normal, of the evolution of salivary calculi, as it has been described by a physician whom I cited to you as having experienced a cure in his own person. Sometimes when fistulas are produced they serve for a passage by which the calculus is expelled, but these cases are rare. But oftenest the fistulous tract conducts the probe to a body which is hard and sonorous: this is the calculus. The diagnosis is made; but if left *in situ* it almost invariably remains fixed, being held by the adherence of the mucous membrane, and the character of the orifice is not favorable to spontaneous expression.

Finally, in certain cases, as we have seen, the calculus permits the flow of saliva; if there have been accidents in the region of the gland they become harmless, and it is solely by its volume, which interferes with mastication and the production of sound, that the concretion attracts the attention of the patient.

Diagnosis.—Absolute diagnosis in these cases is, nevertheless, not always easy. I have said to you that inflammatory phenomena in the region of the gland, and which ought to be our guide, sometimes are due to other causes. Moreover, the proof of the presence of a calculus may present serious difficulties.

In a case, of which Dr. Hervetz, of Chégoin, has given me the history, to an enormous swelling of the neck was joined such a constriction of the jaws that the patient could open them only a few lines. In such circumstances only an approximate diagnosis can be made, and the doctor can only be guided by such antecedent history as would allow a presumption of the existence of an obstacle to the flow of saliva. When, on the contrary, the patient can open the mouth, and a rational examination of the functional troubles causes us to suppose the presence of a salivary calculus, we have only to put our finger on the tongue to feel a tumor absolutely hard, at the floor of the mouth. To be more sure, we have only to probe the canal, which act, however delicate it may be, is always possible provided that we examine the patient as you have seen me do, in a sufficient light, opposite a window, for example, and that we employ a very small probe, say one of Bowman's probes, or such as belong to Annel's syringe.

At from five-eighths inch to one and one-eighth inches the stony feel of the calculus will confirm the diagnosis. If probing is impossible, which ought to be rare, but which it is necessary to foresee, we can accomplish the same end by running a needle perpendicularly through the tumor, as you have seen me do, the needle finding the calculus almost as quickly as the probe, and this practice is without inconvenience.

The differential diagnosis is more difficult. We must indeed distinguish the salivary calculus, first, from those acute and chronic swellings of the submaxillary gland which are the product of other causes; second, from those cysts which form in the neighborhood of Wharton's duct, and are called ranulas; third, from various tumors which we find on the floor of the mouth, from real stones under the tongue, and from teeth which have deviated or made error of way, of which the case of Stansky has shown us an example.

In the first place, doctors of large experience have been deceived by a swelling of the submaxillary gland. Thus, in 1852, at the Biological Society, Rayer reported the history of a doctor who had for several years treated himself for a periodical swelling of this gland, without suspecting its character.

Rayer, on examination, believed he saw something whitish across the dilated canal of Wharton, and which proved to be a salivary calculus. It was expelled spontaneously.

Jobert, in an analogous case, hesitated. His patient was taken in 1850 with very grave symptoms, of which he could not determine the cause, when the expulsion of a salivary calculus caused the symptoms to cease. The patient returned in 1852 with a noticeable swelling of the gland. Jobert suspected the existence of a new calculus, but as the probe discovered none, and the symptoms persisted, he undertook the extirpation of the submaxillary gland. But during the operation he perceived the existence of a calculus, deeply seated in the tissues of the gland. Notwithstanding a hemorrhage which took place during the following night, the patient recovered, but in 1857 he returned again with a third attack. This time the calculus was situated in the deepest part of Wharton's canal.

Recently Dr. Duplay saw an analogous case. A patient came first to him in 1869, with grave symptoms in the region of the gland, caused by a calculus under the tongue, and which he extracted; but in 1874 the same patient returned with a noticeable swelling of the gland, but without any appreciable tumor in the floor of the mouth. An incision of the engorged gland permitted the escape of a new calculus, which was the cause of these symptoms. And notice carefully, gentlemen, that in these cases there is no question of calculi inadvertently left *in situ* at the first operation. Each time the tract had been carefully explored and found free. There is then something like a lithic diathesis, due to that dental tartar which appears to me to be the point of development of secondary salivary calculi. In fact, after the first operation the pocket where the calculus rested remains for a long time open, and accessible to foreign bodies in the mouth, we comprehend that the *débris* of this tartar can introduce itself in that way into the salivary ducts.

Finally, gentlemen, Dr. Terrier presented, some months since, to the Surgical Society a calculus found in this gland, and which he had extirpated. Although a calculus or a fragment of a calculus had been extracted by the mouth some months before, still the enormous swelling of the gland, as in the cases of Jobert and Duplay, had imposed itself upon the mind as a degeneration of this organ. The other half of this calculus, as I have told you, was found after the extirpation of the gland. The patient recovered.

You ought, therefore, to comprehend that the diagnosis of certain calculi, complicated with symptomatic or idiopathic inflammation of the submaxillary gland, may sometimes be surrounded with great obscurity. Dr. Chassaignac, for instance, had diagnosticated an inflammation of the submaxillary gland; a few days afterwards a slip of straw was expelled from Wharton's duct. The case you will find reported at length in the bulletins of the Surgical Society. I also recall to you the fact that a hog's bristle had caused the symptoms, of which the nature was unknown, in the patient of Jobert.

Sometimes, also, inflammation may set up in the gland without there being any foreign body in the canal, examples of which we find in the thesis of M. Crouzet (1874).

Guided by these histories and by the remittent form of the symptoms, the surgeon will try to feel the calculus by direct probing through the canal or indirectly by the pin; but if these means cannot be employed, or give a negative result, we had better rest in doubt than to make an erroneous diagnosis. Thus may be explained the many cases of unrecognized calculi that we meet in science.

Secondly, the symptoms which accompany salivary calculi may confound this affection with ranula. This statement demands some explanation. What is a ranula? Laying aside the ancient prejudices which saw in this sort of tumor only one variety of serous cysts under the tongue, Louis, in the eighteenth century, taught that the ranula was due to the accumulation of saliva in Wharton's canal. This opinion, which was afterwards rejected, and the doctrine admitted that the ranula was developed at the expense of the submaxillary gland, was founded only upon rare cases. Thus, Jarjavay observed a case seemingly like this, and of which M. Forget made an interesting report to the Surgical Society. I have myself seen an authentic case of a salivary ranula in the dilated canal of Wharton, and you will find it published in the same report, but still, at one time, it was only a question of exceptions.

The question, being clearly between sublingual cysts, independent of Wharton's duct, that is to say, ranulas, properly speaking, and salivary calculus is soon resolved. In general the calculus forms a hard tumor; the saliva does not accumulate behind it. Nevertheless, the fact has been observed by Dr. Duprés at the Hospital Cochin, and he published the case in September, 1872, in the *Gazette des Hôpitaux*. But in these isolated cases themselves, you understand, the probe cuts the question short by discovering the calculus, if it exists, by contact of the sound, or by showing that the canal is free from any tumor if it is a ranula.

But you know that for a long time we have considered stones under the tongue as petrified ranulas. What truth is there in this supposition? Are there well-proved petrifactions of sublingual cysts? We may suppose it by analogy, although we are in want of well-observed cases of the kind. It is certain that we have seen calcifications of serous cysts, and here is an example: A few days since I brought Mr. Dussaussay, my intern, to assist me to extirpate a cyst in the mastoidean region in a young and very handsome woman. After having made the incision in the skin, posterior to the tumor, so as to leave the cicatrix as little apparent as possible, my bistoury encountered a hard body which notched the blade. Through this incision I then expelled stony concretions, which were composed of phosphate of lime. I here had to do with the calcification of a sero-sanguineous cyst.

It would be the same with a true ranula, subjected to the same modification. When I filled the place of Professor Croquet, at the Clinical Hospital, a patient came to be relieved of a very hard sublingual cyst which prevented his speech. I incised the mucous membrane over the tumor, intending to perform Jobert's operation of again bringing together the lips of the wound, when we were astonished to see a round, hard body jump from the wound and rebound upon the table. Astonished at first by an incident so unlooked for, and by the repeated and strange boundings which this foreign body made, and which had enucleated itself so abruptly, I seized it, and was able to prove it to be a hydatid cyst, invaded at several points by calcification, and that the instantaneous contraction of the subhyoidean muscles had ejected the body as soon as the incision was made. Dr. Robin, who made a careful examination of the calculus, confirmed my opinion, finding in its center the characteristic laminæ. It must, therefore, be admitted that certain cysts in the floor of the mouth may become incrusted with calcareous salts; and perhaps the ranula may itself suffer this transformation, though we are not in possession of any examples,—at least, we are not willing to count as such three cases of calcified ranulas which have been transmitted to us by the surgeons of the sixteenth century, who were not well instructed, and who were not aware of the difficulties of the question.

Third. Can the salivary calculi be confounded with the other tumors in the floor of the mouth?

I recall to you here, gentlemen, the interesting case of Stansky. This physician was consulted by a young girl who, without having felt any pain, or remarked any symptoms in the region of the submaxillary gland, had noticed the development of a hard tumor under the tongue. Wharton's canal was not probed, but by an incision Stansky discovered a hard tumor, situated between the jaw and the canal, and which contained two teeth. The case was interesting, but the doctor who had observed it was wrong in the deduction that all salivary calculi had for cause an abnormal development of teeth. It was a grave error.

In the case of Stansky, it was not a question of calculus, but of an anomaly; of a deviation of a dental follicle; in a word, of dentition in an isolated place. The diagnosis should not be obscured by analogous facts, because it is a rule to be generally observed that we ought not to allow ourselves to be stopped by these isolated cases, these curious and rare anomalies, when there is doubt; and besides, do you not see that the probe will quickly indicate the nature of the affection, and that Stansky would not have made a barren hypothesis, if he had used it?

Prognosis.—I have but little to say to you upon the prognosis of salivary calculi. In general, it is the prognosis of an annoying affection, but benign and amenable to treatment easily made. Nevertheless, we see from time to time more serious symptoms, and which menace danger.

Dr. Hervetz, of Chégoin, sometimes feared for the life of his patient; Jobert also manifested the same alarm in his case. Finally, in the case of parotid calculus observed by Fardeun, of Saumar, the inflammatory swelling of the cheek necessitated repeated deep incisions, which arrested the progress of the symptoms.

Treatment.—Salivary calculi are surrounded, as we have seen, by accidents more or less grave, and which may demand special treatment. When, then, the calculus, by its presence, has caused submaxillary swelling and constriction of the jaws, what must we do? You must follow my plan in a case reported by Dr. Forget in his report of Jobert's case. A young man, of twenty-seven or twenty-eight years, had had a very noticeable submaxillary tumor for some days. He was anxious, and had extreme dyspnœa. The question of tracheotomy was discussed, so imminent seemed the danger, but I decided to incise the tumor freely under the jaw, when there ran out an ill-colored liquid; and when I had enlarged the incision with a fluted sound, a remarkable quantity of viscid saliva escaped also. I had opened the gland where the saliva had accumulated, because of a constriction of Wharton's duct, consecutive to a chancre.

This patient died some years afterwards of syphilitic meningitis, for which he was treated by Doctors Bouilland and Ricord.

Thus all the therapeutical indications are to prevent suffocation by incisions deep enough to reach the gland itself.

As for the rest of the treatment, after having already discussed the question of the therapeutics in the case of our patient, and given my reasons for preferring to extirpate by a direct incision of the mucous membrane over the tumor, I need not add more. You must know, however, that the calculus sometimes steals away, so to speak, and appears to disappear in the depths of the sac, where it is difficult to seize it. In an analogous case, Dr. Maisonneuve overcame this difficulty easily by passing a silver thread behind the calculus, and so drawing it out. Sometimes, on the contrary, the calculus is in a manner bound in by a sort of hour-glass constriction, and it is then necessary to gently rock it with the fluted sound, pushed under it. Finally, if there are fistulas, we may use them for getting at the calculus, and withdrawing it after having loosened it in its place. After these operations the patients recover. Is there a salivary fistula? It matters little to them, but to satisfy a legitimate curiosity we shall endeaver to elucidate this unknown point by an attentive and prolonged observation of our work. It remains yet subject to relapses of which science offers several examples, and these relapses may, perhaps, be evaded by a very simple prophylactic treatment. In this study I have arrived at the hypothesis that the production of salivary calculi is not without relation to the deposit of tartar upon the teeth of persons who are habitually careless of their persons, and it is perhaps in the hygiene of the mouth that we are to find the means of preventing either the formation or the "morbus redivivus" of salivary calculi.

[Since the publication of the foregoing clinique, Dr. Sirus Pirondi, Professor in the school of medicine at Marseilles, has sent an answer to the question of Professor Richet, "What is the result of the wound in the operation of incising the mucous membrane for the extirpation of salivary calculi?" and which is here appended.—Translator.]

In his letter to Professor Richet he says, "Circumstances having favored me twice in this relation, I felt that I ought to give them to you."

Case I.—"In 1869 a man, aged thirty-six, came to the Hôtel Dieu to consult our lamented colleague, Dr. Broquier. He said an abscess had burst spontaneously in his mouth at the left lower jaw, about three weeks before, and since then there had been incessant running of purulent saliva, impediment in speaking, and particularly in mastication, swelling, etc. Broquier's diagnosis was salivary calculus. He enlarged the opening and took out, without very much difficulty, a stone the size of an almond. The orifice of Wharton's duct was intact and communicated with the bed of the calculus. After some days the wound was completely cicatrized, the canal remained permeable, and the place, which I saw often afterwards, showed no signs either of the operation or of the accident which had caused it."

Case II.—"In 1871 I was called to see a sea-captain afflicted with a salivary calculus. Finding the mucous membrane perfectly glued to the calculus, and orifice of the canal intact, although slightly dilated, I was not willing to touch the orifice, but cut directly upon the calculus (antero-posterior diameter), and using a small, inflexible spatula, I easily enucleated a stone of great size, weighing a little over one hundred and twenty grains, oblong, one and a half inches in length, and a circumference in the middle of seven-eighths of an inch. It presented on its sloping surface a canaliculus deep and covered, and nearly a quarter of an inch long. The wound cicatrized promptly, and without other care then frequent washings. It has left no trace, and in the frequent voyages of this captain to Marseilles I have easily satisfied myself that the functions of this part of his mouth *are intact*. Here, then, are two examples of salivary calculus without abnormal consequences—such, for example, as obliteration of Wharton's canal—and without return of the calculus."

[The editor of *La France Médicale* adds to this that Professor Richet had, on the 20th January (1876), reported to him that the patient operated on by him (the Professor) in December, had a large fistula at the place of incision not yet healed.—The Translator.]—*Professor Richet, Surgeon at the Hôtel Dieu Hospital: with an appendix by Professor Sirus Pivondi, of Marseilles. Translated from the French by Barnard Ellis, M.D.—In Ohio Medical and Surgical Journal.*

Death from Ten Grains of Chloral.—Dr. E. E. F. Ingalls, *Chicago Medical Journal and Examiner*, reports:—"A German woman, about thirty-three years of age, apparently healthy, came into the office to have some teeth extracted. She desired some medicine to prevent the pain, and the doctor gave her ten grains of hydrate of chloral, which dose he repeated in one hour. Soon after the second dose the patient manifested alarming symptoms of poisoning, and although all was done that could be to resuscitate her, she died in about fifteen minutes."—*Medical and Surgical Reporter.*

HINTS AND QUERIES.

"HE that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WHAT is the cause of and remedy for the sandpaper-like roughening of the enamel surface of continuous gum teeth when taken from the furnace?—S. T. W.

I HAVE tried iodine for rusting out a piece of an instrument broken off in the root of a superior molar tooth. I have also tried to remove it with nerve instruments, but without success. Should be glad to be informed how to accomplish it.—M. M. J.

WILL some one give the formula for a mouth-wash or powder which will prevent the re-accumulation of tartar after it has been thoroughly removed from the teeth?—M. H. S.

IF Sigma will be kind enough to communicate through the DENTAL COSMOS, the simple and easy method of showing under the microscope the branches of the dental nerves entering the tubuli with the fibrils, he will greatly oblige many observers besides J. S. LATIMER.

A YOUNG LADY, aged thirteen years, applied to me to have a tooth removed from the roof of the mouth. It was situated on the left of the median line, one-quarter inch back of the central incisor, a supernumerary, cone-shaped, and very firm. I opened the soft parts to the bone, and, as there was no chance to grasp the tooth with the forceps, I excised the crown with a pair of bone forceps.

I would like to know the probability of interference with the central incisor, or how to proceed for the removal of the root of the supernumerary.—F. A. FENDERSON.

MRS. W., 60 years of age, widow, in robust health, observed some seven years ago a small, red, firm, painless tumor, springing from the gum at the inside of the lower left canine tooth. Some six months ago she had her teeth extracted for the purpose of wearing a plate. Immediately after the tumor grew rapidly, attaining a size nearly as large as a cherry, of a flattened ovoid shape, its upper free surface being larger than its base. It is of a livid color, painless, and nearly devoid of sensibility. After complete excision it attained its former size in about two weeks, notwithstanding its site was freely cauterized with nitrate of silver, applied repeatedly. Dr. Dana of this place has tried electrolysis by introducing needles in its substance and passing the electric current on two occasions without producing alteration in its size. Would like to know what treatment is indicated.—C. E. I.

A CUSPIDATUS TOOTH erupted between and over the central and lateral incisors, the latter occupying the exact place of the former. I extracted the cuspidatus, and moved the lateral with rubber bands to its proper position. The patient, 21 years of age, in attempting to remove the band which was ligated in the space left by the extracted tooth, to keep it out of the way of the tongue, succeeded in removing it from all save the tooth under treatment, which, being a sharp cone, allowed the rubber to slip up and under the gum, cutting the gum loose up to the alveolar process. Fourteen hours after, and after eating his breakfast, the patient came to me, when I removed the band. The tooth has ever since been very loose; the gum adheres only at the free margin, being completely loosened from it,—from the margin to the process. Scarifying and use of iodine have no effect. Can any one give me the reason why, and the cause of the general looseness? This tooth bears no resemblance whatever to the other lateral incisor, the crown being large and round, and almost as thick through the cutting edge as one of the bicuspids, while the neck is very small, and the root much smaller. I have never seen a tooth belonging to an arch resemble it, but I extracted a supernumerary tooth, fully developed, a short time since, which erupted within the superior maxillary arch, the crown of which was pressed against the second molar. This supernumerary tooth was almost a counterpart of the lateral incisor being operated upon. I should be pleased to have some expression of opinion upon this case.—J. M. F.

If W. L. D. will prescribe the following after the extraction of teeth he will, I think, be satisfied with the result:

℞.—Potassii chlorat., ʒij;
Tinct. krameriæ,
Glycerinæ, āā f℥ss;
Aquæ rosæ, q. s. ad f℥viii. M.

Sig.—Rinse the mouth six or eight times daily.

Another of equal efficacy is the following, the patient adding the menstruum or solvent (water), and may be prescribed in cases where the patient cannot afford to pay the high price asked by most druggists for water, when dispensed as medicine:

℞.—Potassii chlorat., ℥i;
Acidi tannici, ℥iss. M.

Ft.—Pulv. et in chart. no. viii., div.

Sig.—Dissolve one powder in a pint of water, and rinse the mouth frequently. —A.

W. L. D., who asks what is the best mouth-wash to heal and harden the gums after extraction, is recommended to try phénol sodique diluted with say a tablespoonful to a half-tumblerful of water.—M. X.

W. L. D. asks, "What is the best mouth-wash to use after extraction of teeth to heal and harden the gums?"

I have used the following formula for years with the most gratifying results:

℞.—Potassii permanganatis,
Hydrastin sulph.,
Acid. tannici, āā gr. x;
Aquæ rosæ, f℥iv.

Shake this preparation well before using; add a teaspoonful in a small wineglass of water, and hold in the mouth for a few minutes. If all the teeth should be extracted at one sitting, I always use the remedy at first without diluting. This preparation will in a short time stop all pain that may arise from any exposure of the alveolar processes caused by extracting.—M. H. W.

W. L. D., who asks for a mouth-wash to use after extraction of teeth to heal and harden the gums, is recommended to try the following formula, which I have found very efficacious:

℞.—Aluminis pulv., ʒi;
Glycerinæ, ʒij;
Aquæ, f℥vj. M.

This may be directed to be used as a wash three times daily.

In cases of diseased gums, caused by the local irritation of salivary calculus, I have found, after the removal of the exciting cause, that Harris's gum-wash (for formula of which see Harris's "Principles and Practice of Dentistry," page 169), applied in the same manner as the first-mentioned prescription, has produced very happy results.—F. F. Drew, D.D.S., *Baltimore, Md.*

Reply to W. L. D.—

℞.—Aluminis pulv., ʒi;
Aquæ, f℥viij. M.

has given the best satisfaction.—W. S. E.

Note.—We agree with our correspondents that alum is very efficient in the healing of wounded and inflamed mouths, but suggest that it is contraindicated in mouths where teeth are present, in consequence of the injurious action of the free sulphuric acid upon these organs.—Ed. Dental Cosmos.

Reply to A. J. R., who asks the best way to *insert* and finish a gold filling, etc. Use Quarter-Century gold-foil, No. 4, soft. Cut each leaf into three or four strips and make ropes and ribbons, cutting them into short pieces. Commence your filling with soft foil, and continue using it until you have all difficult points filled, and your filling as nearly as possible brought to a smooth, even surface. Then use your foil *strictly cohesive*, made so by passing each piece of gold as you wish to use it through the blaze of your lamp until it is brought to a *cherry-red heat*, then apply to the surface of your filling immediately, packing the same down with *smooth-faced* (or very nearly so) *needle-points* and *small foot-pluggers*.

You can use prepared cylinders and pellets in the same way very nicely. Finish your filling in the ordinary way, giving the surface a good polish with your engine and polishing-wheels.

Apply rubber dam at the first to protect the cavity from the saliva, also from the breath of the patient. Your "pits and scratches," I think, come from the serrations in your plugging instruments

If you will operate carefully, as herein directed, you will have a filling which will retain its lustre for the next *century*.—L. D. C.

Reply to W. H. H., who asks how to mend celluloid plates. Prepare the plate in the same manner as one of rubber, being careful to scrape very thin each side of the break. Fit a piece of celluloid as near as possible to the part broken; saturate the piece and the broken parts in a solution of nine parts of ether to one of alcohol for five minutes; press firmly together, as with rubber, using dry heat. Allow the plate to remain three or four hours, then finish as when new. To replace teeth, fit the teeth to plate the same as for a rubber plate. Fit a piece to the space filed away; saturate, and press together as above.—H. D. Hickok, *Wells' River, Vt.*

Reply to J. H. Burks, who inquires for a local anæsthetic. Try the following:

℞.—Tinct. aconiti rad.,
Tinct. opii,
Chloroformum,
Alcoholis, āā fʒi.

Mix, and apply to the gums on cotton or sponge until they whiten. This preparation will, in most instances, materially diminish the pain of lancing the gums and of extraction. The patient should be cautioned against swallowing any of the fluid with the saliva. Sometimes the application will irritate the mucous membrane of the mouth.

If any one knows of a better local anæsthetic than the above, I hope he will give it through the Dental Cosmos.—C. Everts.

Reply to J. A., who asks concerning pivot teeth. The inventive genius of dentistry—in the direction of mechanics—is at the present time so active that each day is producing its new things. Among the best of the inventions in the way of pivoting is a device of Dr. Bonwill's. The root being cut down, the pulp-canal is reamed out greatly in excess of the size of the pivot that is to occupy it. A pivot made of platinum wire, upon which a screw is cut, is next fitted into the canal, and firmly packed into place through the use of amalgam. When this amalgam is set, the tooth—the pivot hole running through it—is placed upon the pivot, and is screwed solidly into place by means of a delicate nut, made of gold. It will be understood, of course, that the fitting of the tooth in position has been done at the time of setting the pivot into the root. This operation, when well accomplished, holds a pivot tooth so firmly in its place that it may be used with the utmost freedom in mastication.—E. O.

In answer to numerous letters of inquiry concerning salicylic acid as a dental medicament, I would reply that I have found it an excellent antiseptic *canal dressing*, either in solution in oil of cloves (salicylic acid, gr. x; oil of cloves, f℥ss) or in powder carried by a probe, previously moistened in oil of cloves.

I prefer advising the latter method as the safer, for the action of salicylic acid upon dentine is markedly injurious,—dissolving out the inorganic constituents and leaving the usual *horny* residuum.

For this reason cavities of decay should not be moistened with preparations containing this acid, as an antiseptic, prior to filling.—J. Foster Flagg, D.D.S.

Replantation.—On the 6th of May, 1876, a young man came to my office suffering with toothache of the right superior lateral incisor. He refused to submit to any treatment of the tooth, and insisted on its extraction, which was done. After examination I concluded to try the experiment of replanting it. After filling the root and crown and removing the pus-sac, and taking off a small portion of the root, which had been partially absorbed, I replaced it, securing it in place by fastening it to the adjoining teeth on either side with silk thread. The fastening after a few days was removed. More than a year has elapsed since the experiment was made, and it has proved to be a complete success. The young man tells me that he knows no difference between that and his other teeth.—E. H. Locke.

A New Method of taking Difficult Impressions.—I recently took an impression for a partial lower set, where the few remaining teeth were very irregular, in the following manner: I procured of a painter some empty paint-tubes, and having had them cleaned, cut pieces or cylinders long enough to cover the teeth, having the diameter of the tubes to correspond with the irregularity of the tooth; these tubes I filled with wax and placed them over the teeth, setting them regular, and, after having cooled the wax with ice-water, I introduced my plaster for taking an impression in the usual manner. After the plaster had set I found no difficulty in removing the impression, the wax in the tubes allowing it to be removed with very slight fracture, and with no pain or inconvenience to the patient. —A. H. Best, M.D., *Savannah.*

Farrar's Alveolar Abscess Syringe.—In reply to questions from some who appear to have difficulty in charging and using the alveolar abscess syringe, I will say that it requires some patience at the outset, but when understood it offers one of the simplest and most effective methods of treating teeth which I have ever known. Cases can be cured by its use which could not be by any other method.

The fee for curing one otherwise almost incurable molar abscess will pay for two syringes. To charge the syringe, remove the thumb-screw frame attachment, also the nozzle, as it is too small to permit creasote to pass up the tube freely, the atmospheric pressure not being sufficient in so minute a tube. Then, having placed some of the drug in a small cup (a small salt-cellar will answer for the purpose), introduce the nozzle end of the barrel into it, and charge as in the ordinary manner until about half full. Then insert the syringe, screw on the tube, and force out the air until the drug escapes on a napkin, free from bubbles of air. Now place on the thumb-screw and frame, and it is ready for several days' use. For convenience I have had made an extra and larger and somewhat longer tube than the one used for injecting with, which I designate as the charging tube, by which I am enabled to charge the syringe much more readily, and directly from the bottle; after which I exchange it for the small tube, and the syringe is then ready for use, causing no smell of creasote in the office.

Aromatic sulphuric acid should not be used in a syringe having a leather piston packing, as the drug will ruin it; but sulphuric acid, pure, may be used with rubber packing without injury to it. For convenience I make use of two syringes, one for creasote, the other for acid.

To inject an abscess, first place a small piece of cotton cloth in contact with the orifice of the fistula, and then carefully introduce the injecting tube, passing it up until it enters through the orifice in the alveolar process into the sac. An assistant (or the patient, if no assistant be present) carefully turns the thumb-screw until the drug slightly regurgitates out around the tube into the napkin; remove the syringe, and the abscess is left filled with the drug. To cure ordinary cases requires about four or five injections, made about five to six days apart.—J. N. Farrar.

Dr. C. J. Essig, in the June number of the Dental Cosmos, says it is his humble opinion that the abnormal condition of the tissues so often seen in cases where vulcanite is worn is due to the fact of their being covered by a non-conducting substance and want of cleanliness. Doubtless these causes will produce abnormal conditions, but when Dr. Essig says that he does not believe that any one ever experienced the physiological effect of mercury in consequence of the presence of vermilion in artificial dentures, is he not placing his belief against other men's experience? Celluloid and vulcanite are said to possess about the same conductibility, and yet it is a fact that when those abnormal conditions of the mucous membrane seem to have resulted from wearing vulcanite the tissues recover immediately when a celluloid plate is substituted; showing that the conditions were not caused by the non-conducting qualities of vulcanite, or owing to uncleanliness.

Our own experience of the difficulty spoken of has been with patients who are very susceptible to the influence of mercury, either from idiosyncrasy or from having been previously salivated by mercury.

We have always thought that the trouble was caused by the vermilion contained in red-rubber plates, for we have never seen black rubber cause such trouble.

We do not think the trouble is from any elimination of the mercury (yet it may possibly be), but by catalysis, if such an expression is admissible. That is, from contact.—C. R. Taylor.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to Act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 398.)

At this point, during the discussion of arsenical applications, it becomes important to direct attention to an occasional, but none the less unfortunate, result which sometimes quickly follows the employment of this medicament.

I refer to that intense determination of blood to the pulp which eventuates in such thorough congestion as to cause "*suffusion*,"—a pinkish or purple discoloration of the crown and neck of the tooth.

This is a true effusion of blood into the dentinal tissue, and is analogous to *ecchymoma.*

After quite an extended experience in the treatment of "*suffused teeth*," both in my own practice and in consultation, I am decidedly of opinion that the practice which promises best is that of *promptly* and *freely* opening into the pulp-cavity, extirpating all of the pulp which can be done comfortably—permitting the most possible of relieving pulp-hemorrhage—gently, but effectively, stopping the canal (above the suffusion) with cotton, slightly dipped in solution of gum sandarac, thoroughly washing out the pulp-cavity and cavity of decay *with tepid water*, and then *leaving the tooth entirely open.*

In the course of a few hours, or, at most, a day or two, these teeth generally resume a comparatively natural color, sometimes returning completely to the ordinary shade of a pulpless tooth.

On the contrary, if medicaments—such as chalk, lime, chlorine salts of various kinds, creasote, alcohol, etc., throughout the long list which I have repeatedly seen used and abused—be resorted to, my experience is *that no benefit is ever derived*, but that repeated cases have occurred in which the objectionable *rose-color* was deepened into the far worse shade of *chocolate-brown*, and so *fixed* as to be *indelible.*

In some instances, where the color, though "fixed," was yet not very decided, I have made respectable results by excavating all the crown dentine and filling the entire cavity with *very white* oxychloride of zinc (made without any coloring, for this purpose); which, after hardening for one or two weeks, was sufficiently excavated to permit of its being covered with a permanent gold, amalgam, or gutta-percha capping.

Secondary applications of arsenic.—The fact that a first arsenious application to a dental pulp is not always sufficient to insure the complete extirpation of the organ has been recognized, and referred to, from the earliest days of the acceptance of the devitalizer.

The oldest writers mention the "renewal of the application, if the part be still sensitive."

As the result of *longer duration* of application than is usually practiced, a diminished necessity for secondary *arsenious* medication is naturally expected.

This expectation is realized, for it is almost always sufficient for thorough devitalization that a liberal portion of the paste of acetate of morphia and oil of cloves should be introduced into the pulp-cavity and *gently* passed into the canals with a fine probe, and thus punctured into the remaining portion of semi-devitalized pulp-structure.

While, however, this is usually comfortable and acceptable practice, it will occasionally be found too painful; and thus it is that a *second* and sometimes even a *third* arsenical application will have to be resorted to.

In *upper teeth* I regard these very deep placings of arsenious acid as comparatively safe, for every tendency in subsequent operating is toward the complete removal of every portion of the medicament; but in *lower teeth* I must advise that recourse be had to other agents than arsenic, when it is found necessary to devitalize *canal portions* of pulp.

The tendency of all applications, and *the result of all instrumentation*, is, in more or less degree, that of rather leaving some portion still at the very lowest part of the canal, or, indeed, passing some through the apical foramen, than of favoring its satisfactory withdrawal.

For this reason I advocate, and practice, a longer duration of *first* application of arsenic in lower teeth than in upper,—that I may, on general principles, have less likelihood to need any second application; and in cases where I encounter difficulty in devitalizing, I prefer to give the required *time* for that death of the canal portions of pulps which is almost sure to ensue; aiding in this only so far as is sufficient to insure exemption from suffering by appropriate applications, such as have been referred to as "pain-obtunding."

The methods for procedure which I have given in connection with the use of arsenious acid for pulp-devitalization have now had the test of an experience of twenty years, during which long time the results have been uniformly gratifying both to patients and to myself. I think they will require but few trials at the hands of any practitioner, desirous of an advance upon previous results, to commend them to favorable consideration.

I wish, however, again to impress the *truth* that, valuable as is arsenious acid for remedial purposes, it is also *very potent for harm.*

Much has been said of the danger of its *use*, but an extended observation and experience convinces me that it is to its *abuse* that all the evil results, which have positively attended its exhibition, are to be attributed.

I have met with three cases, and now possess the specimens, in which applications of arsenic had been made *through* the roots until the peridonteum was destroyed, and necrosis was the natural result.

I have also in my possession two teeth (second bicuspid and first molar) which, together with all intervening and immediately surrounding structure, were destroyed by persistent arsenical applications, placed in a cavity upon the distal face of the bicuspid.

This was doubtless the result of insufficient protection, as the unsuccessful attempt at retaining the arsenic within the cavity had been made with a covering of wax.

I have heard it stated, in discussion, that arsenical applications cannot do much harm, for if they do come out and are *swallowed by the patient* they are insufficient to produce even sickness.

It is nothing more nor less than *folly* to feel secure in regard to the impotency for harm in this medication, merely from the fact that if the whole amount applied be swallowed the patient will not die! for, strange though it be, it is nevertheless true, that swallowing the application (cotton and all), would be the most positive way of insuring no possible harm, as the result of ignorant and incompetent manipulation.

It is, then, a matter of much moment that an operator should possess at once a reliable degree of information as to special dental anatomy, diagnostic ability sufficient to distinguish as to whether trouble comes from the inside or the outside of a tooth, and manipulative skill adequate to the prevention of the action of agents employed in any other than the designed direction.

With these requisites one *must* be successful in the arsenical treatment for the devitalization of the pulps of teeth.

Without them all good results are but the fruits of fortunate blundering, and all signal failures and dreadful consequences nought but what might have been reasonably expected.

It remains now that I give a few words of caution in regard to the employment of arsenious acid in deciduous teeth.

I desire, as these infrequent opportunities present themselves, to impress the *principles* which dictate the marked differences in the "treatment" of *permanent* and *deciduous* teeth.

It must constantly be remembered that the deciduous teeth are, for every dental operation except that of lancing the gums, governed by considerations and conditions diametrically the reverse of those which pertain to the permanent teeth.

So far as lancing the gum is concerned, the same kind of irritation, resulting in the same kind of suffering, is relieved by a like operation, —but that is the end of analogy.

The opposing considerations which govern all other treatment are,—

1st. That the deciduous teeth are intended to subserve a temporary purpose *only*, while the others are *intended to be permanent* (*i.e.*, to last for life).

2d. That in *deciduous* teeth the ordinary cavities of decay are usually filled with such materials and in such manner as will subserve sufficiently the temporary requirements, while in *permanent* teeth all the judgment, knowledge, and skill at command are utilized for the performance of the most durable operation possible.

3d. By the time that *deciduous* teeth *usually* require the first attention of the dentist their roots are fully formed, and are about to enter upon the process of absorption, while, in the case of permanent teeth, beginning with the first permanent molars, the roots are seldom fully formed when first attention is needed by the crowns.

4th. Irritation of the pulps of deciduous teeth is to be deplored, from the fact that interference with the *normal absorption* of the roots of these teeth must necessarily result, while irritation of the pulps of permanent teeth as naturally interferes with the *normal formation* of their uncompleted roots.

5th. The devitalization of the pulps of deciduous teeth causes complete cessation of *true absorption of their roots;* and, although some further chemical disintegration of these occasionally occurs, yet the physiological "shedding" of such teeth is practically and promptly changed to the pathological phenomenon of "exfoliation," while the premature devitalization of the pulp of a permanent tooth causes as complete cessation of *further root formation*, and thus leaves, semi-permanently, a pathological tooth which is, at best, only *tolerated* by the surrounding tissues, and which is incapable of being *thoroughly* operated upon in any other way than by extraction and replantation, on account of its largely open, unformed, non-foraminated root.

6th. Every consideration of dental practice in connection with *deciduous* teeth should point to the comparatively early loss of *rootless crowns;* while every consideration of dental practice in connection with the *permanent* teeth should have in view the greatest possible prolongation of usefulness, for even *crownless roots!*

Thus it is that, while every anatomical and physiological consideration supports the teaching of the safety of arsenical devitalization of the pulps of fully-formed *permanent* teeth, when the exigencies unfortunately demand it, it is equally to be remembered that every anatomical and physiological consideration pertaining to such *deciduous* teeth as have become so far the victims of caries as to necessitate the devitalization of their pulps, points to the impropriety of using arsenious acid for this purpose.

It will be found that the paste of acetate of morphia and carbolic acid, or that of tannin and glycerine, or carbolic acid or creasote, on small pellets of cotton, or *dental* tincture of iodine, applied very carefully in the same manner, will comfortably meet every indication in a vast majority of cases of exposed deciduous pulps.

First, the obtunding of sensibility, and thus relief from pain, is afforded by the local application (gently) to the irritated pulp; and,

Second, the devitalization of the pulp, and consequent immunity from that form of toothache, is secured by such *gradual pressure* upon the pulp as will be tolerated, by means of the suggested medicated cottons.

This devitalization *by pressure* will usually be an easy task; but, in this process, great care should be taken not to exert undue or hasty pressure upon the pulps, nor to allow any overflow of the medicaments used upon the cotton.

This is particularly enjoined when carbolic acid, creasote, or dental tincture of iodine are employed,—*particularly the latter.*

The tincture of aconite is also suggested as an occasional ingredient of "pulp-pastes;" but I would caution against any other than a very accurate and careful use of this, particularly when the *strong dental tincture* of aconite, previously referred to, is being applied.

While this is a very effective pulp-obtunder, and possesses much value on that account, any overflow of the medicine is attended with a *persistent* and very disagreeable pricking and tingling sensation which is most objectionable, particularly with little children. I therefore very rarely use it for other than adult patients.

But, beyond this, cases of exposed deciduous pulps will sometimes occur which nothing but arsenic will control; this is then the final resort, and here, as in so many other points, the opposite of permanent pulp-work holds as good practice.

Time here is to be regarded, and applications of the *least possible length of duration* should alone be indulged in.

From *one* to *three* hours, according to the age of the tooth and the consequent absorption of the roots, should be allowed for an arsenical application.

The younger the tooth and the less the root-absorption, the longer the *time* which may be given with comparative safety.

The older the tooth and the greater the root-absorption, the shorter the *time* which can be permitted for the action of such a medicine as arsenic.

I think it decidedly impolitic to make any secondary application of arsenic in deciduous teeth, for, as the *arsenical impress* of a first application can always be sufficiently seconded by *safe* medicaments, it becomes proper that these only should be used for the final, or complete, devitalization of *deciduous pulps.*

EXTIRPATION OF THE DENTAL PULP.

A pulp having been so far devitalized as to permit of *painless* operating (and nothing less than this is, *in my opinion,* in consonance with the spirit of modern dentistry), it becomes a matter of no great difficulty to "open up" into the pulp-cavity, *provided* that the cavity of decay affords *direct access.*

It, however, becomes important for me to state thus early in the subject-matter of "extirpation," that, as a rule (not invariable, but general), just in proportion as the work of extirpation is *thoroughly done,* so is long-continued and complete success the usual reward.

I have made this statement with the care and consideration which will be found, in practice, to pertain to all statements which have heretofore been given; and it may therefore be *relied upon as correct,* even in despite of the fact that the most careless and imperfect extirpations sometimes give long years of satisfaction and comfort; while occasionally the most thorough, complete, and artistic extirpations eventuate, with most discouraging promptness, in uncontrollable peridental irritation and loss of the teeth.

In the main, however, it is true, as I have said, that long-continued satisfaction from this operation is quite in proportion to the *thoroughness* of its performance.

If, therefore, the cavity of decay does not afford *direct* access into the pulp-cavity and from thence (most important) into the pulp-canals, I regard the original cavity, from this consideration, *merely* as a cavity of decay, prepare and fill it as though there was no other complication, and decide at once upon the most feasible and best point for drilling such entrance into the pulp-cavity as shall most perfectly subserve the purpose of *thorough* extirpation.

This operation is called "tapping" the tooth, and the orifice is called the "tap-hole."

(To be continued.)

DEVITALIZED TEETH AND THEIR MANAGEMENT.

BY DR. F. H. REHWINKEL, CHILLICOTHE, OHIO.

(Read before the New York Odontological Society, April 17th, 1877.)

WHILE choosing this subject the writer is aware that it is somewhat hackneyed, and that the very heading of this paper may cause apprehensions of being called upon to give attention to a lengthy description of different methods of treating and filling pulpless teeth, which methods, promising no new and novel features, will therefore prove wearisome and unprofitable.

This article is not submitted as containing anything particularly new or instructive to the members of this society; rather laying before them, for approval or otherwise as the case may be, some thoughts and observations which it is hoped will be useful and instructive to the younger and coming members of our profession.

If the views and conclusions herein expressed meet with the indorsement of your society, the paper may be thus made profitable, while a non-concurrence with the same will render it harmless.

So much having been written and said on this subject, it will be impossible to preserve a strict originality; when recourse is had to the language of others, due credit will always be given.

In reviewing our literature for the last twenty years, it is gratifying to observe the real progress which has been made in this particular branch of the operative department; still, it becomes at once apparent that in nearly all original communications on the subject in question, also in oral discussions at society meetings, it is treated in a manner which admits of but one inference, viz., that success in preserving devitalized teeth depends almost solely upon the individual skill of the operator, and possibly somewhat upon the materials used in filling the pulp-chamber and roots of the teeth. It is equally true that the writings and sayings of accomplished operators are fearfully contradictory upon essential points; each, however, severally agreeing that if his particular method is carefully followed success will be a positive certainty. The attempt to reconcile and fuse together so many widely-differing opinions would be utterly futile; but there are some minor points, heretofore scarcely mentioned, which, having an important bearing upon the subject, are worthy of consideration. The object of this paper will be to offer to the young practitioner some safe and reliable suggestions in connection with the preparatory or antiseptic treatment of the root-canals of devitalized teeth.

In commencing the treatment of such teeth, the first query in each case which presents itself is, as to the manner in which the vitality has been lost. Has the pulp been destroyed designedly, and by what means? or, has it slowly succumbed to the irritation, inflammation, suppuration, and putrefaction consequent upon the encroachment of caries into the pulp-chamber? subsequent proceedings largely depending upon a correct understanding of these two causes.

When a tooth is intentionally devitalized, arsenious acid is usually the agent employed. Other methods, such as extirpation or galvano-cautery, for instance, are resorted to by some practitioners; but the use of arsenic is, and probably will remain, the favorite means of accomplishing the destruction of a tooth-pulp.

The propriety of using arsenic in dental practice has of late become almost a matter of controversy among members of the profession; some able operators contending that so much harm results from its use that in the present time it is scarcely justifiable. It might be admissible here to say a few words upon this question, as I believe that a *proper* and *careful* application of arsenic will do away with many objections to its use; especially as difficulties and complications do now and then arise in the preparatory treatment of devitalized teeth which are, it is believed, unjustly attributed to the effects of arsenic.

Various methods of applying arsenious acid to the living tooth-pulp have been, and are still, recommended, each by its own particular advocate. Probably the majority of operators use a paste made of arsenious acid, sulphate or acetate of morphia, together with creasote, carbolic acid, or oil of cloves; others preferring cobalt to the white oxide of arsenic. Again, others use a mixture of pulverized charcoal and arsenic.

The advocates of morphia claim for it a pain-subduing effect, and those who recommend other combinations have also their reasons for the choice.; nearly all, however, agree upon the employment of a minute pellet of cotton as a vehicle to convey the drug to the pulp. This was the indorsed method of the profession during the dental pupilage of the writer, and was also made use of by him during the first decade of his practice. His retrospect of this period is both painful and mortifying; he witnessed in these years cases of violent inflammation of the gums, with sloughing of the same, and in some instances slight necrosis of portions of the alveolar borders occurring in his practice, which were clearly chargeable to the effect of arsenic. Subsequent experience, ere the completion of his second decade, compelled him to attribute all these troubles simply to the faulty application of the agent under consideration. It is true, however, that idiosyncrasies are now and then met with where all calculations come to naught, and where the action of arsenic upon living tissue is accompanied by eccentric and singular effects; at times, apparently almost inert upon even well-exposed pulp-tissue, at others, acting with unlooked-for intensity. Fortunately, these cases are infrequent.

Dissenting from the almost universally adopted method of application, namely, a paste of arsenic, morphia, and creasote, or cobalt, or any other mixture, the writer rejects the morphia or charcoal altogether, as non-essential and cumbersome; using nothing but arsenious acid of concentrated strength (Squibb's preparation preferred), mixed with just enough creasote, carbolic acid, or oil of cloves to make a rather stiff paste. This is conveyed directly to the pulp in a manner to be hereafter described. The use of cotton or any other wool as a vehicle is particularly objectionable, as the whole mass becomes impregnated with the arsenic, irritating the gums wherever it comes in contact with them, and, at times, causing violent inflammation, extending even to the root-membrane and partition-walls of the alveolar borders.

Of course, the foregoing applies more especially to pulp-exposure in proximate cavities. In simple crown-cavities, with the walls standing, the above-mentioned objections would lose much of their force.

In applying arsenic to an exposed tooth-pulp in any proximate cavity, every precaution should be used to preclude any possibility of bringing the agent into direct contact with the gums. If the cavity is situated between any of the superior incisors, cuspids and bicuspids, a thin wedge of hard wood driven in between the teeth will, in the majority of cases, fully accomplish the desired end.

Proximate cavities in the superior molars, and in *all* the teeth of the inferior maxillary, are much more satisfactorily managed with the aid of the rubber dam.

After the adjustment of the rubber precisely in the same manner as if the teeth were to be filled, the cavity is dried, the disintegrated dentine removed, and the pulp as much exposed as possible. If the cavity is difficult of access, it is converted into a compound cavity by drilling through the center of the crown. Light being thrown into it by a reflector attached to a rubber-dam clamp, and the precise point of exposure ascertained, the arsenic (say from one-twentieth to one-tenth of a grain) is now conveyed to it by means of an instrument of untempered steel, silver, or gold. Untempered, that it may be bent to suit the particular locality of the cavity and enter it with ease, and reach with its point deep enough to come in direct contact with the pulp; this point is swelled out into a small, flat bottom, somewhat like a burnisher or an amalgam plugger.

The arsenic having been deposited upon the exposure, the excess of moisture is carefully absorbed with Japanese bibulous paper or soft spunk; then, with a minute camel's-hair pencil, a rather thick solution of gutta-percha in chloroform is applied in repeated coatings, until the arsenic is completely confined and shut in. The chloroform will soon evaporate, and the cavity may then be filled with gutta-percha, a compound of beeswax and gum mastic, plaster of Paris, or anything, in short, except cotton or wool. The object in using arsenic of concentrated strength is to accomplish the desired purpose with the least quantity or bulk. As a rule its action is almost painless,—one or two hours' uneasiness in the tooth being generally the extent of the inconvenience,—and the serious consequences heretofore alluded to are rendered almost impossible.

Objections may be raised to this somewhat troublesome and tedious mode of application. Any extra time thus spent, and precautionary measures adopted at this stage of the proceedings, will, in many instances, save a world of trouble, which might otherwise ensue.

The writer has been a resident of the same locality for the last twenty-seven years (practicing first medicine, then dentistry),—a locality, unfortunately, notorious for its malaria and its changeable climate. The prevailing type of disease is of that intermittent character usual to, and consequent upon, malarial poison, with which the residents are more or less charged. This poison enfeebles the constitution and renders the nervous system extremely irritable. Acute inflammatory diseases are of somewhat rare occurrence; flesh-wounds are more inclined to suppurate than to heal by primary adhesion.

This local peculiarity almost precludes the possibility of capping and filling over exposed tooth-pulps,—except in very favorable cases,—and, as danger of chronic inflammation of the root membrane is imminent, it becomes necessary that the preparatory treatment of devitalized teeth should be conducted with more than ordinary care.

The length of time an application of arsenic should remain in any of the single-rooted teeth is determined by the age of the patient; from eight to twelve hours under the age of fifteen, and in older persons twenty-four hours, being the longest time necessary. In all cases it should be removed by the operator himself.

The method of the writer is, to withdraw the temporary stopping, then to thoroughly scrape the interior of the cavity, removing every trace of the arsenic; next, to open the pulp-chamber sufficiently to allow the escape of gas, then to wash and cleanse the cavity with tepid water by means of a dental syringe; finally, loosely filling it with cotton, to remain thus for from two to four days. No application of any kind is made, lest the decomposition of the pulp should be interfered with. At the expiration of the adjudged time, an attempt is made to withdraw the whole pulp; if this cannot be readily done without breaking it, an application of creasote or carbolic acid is conveyed up into the root by means of a few strands of floss-silk or cotton wound around an ordinary smooth broach, to arrest, in a measure, the now rapidly-advancing decomposition of the pulp-tissue, and the case is dismissed for a day or two more; after which time, by patient trying, the pulp will eventually become entangled around the barbs of the broach, and be successfully withdrawn.

The thorough and complete removal of all dead pulp-tissue, which is *absolutely* necessary, has been shown to be, in teeth with but one root, a thing of comparative ease. With bicuspids and molars the proceedings differ somewhat. In these teeth, that portion of the pulp contained in the pulp-chamber may be removed immediately after the arsenic is taken out. With a "rose" bur of suitable size the chamber is to be drilled out, the pulp-matter being excised by this process. The main object now is to get free access, if possible, to the openings of each root-canal; a considerable portion of the crown has often to be cut away to accomplish this. Having succeeded in exposing the openings of the several root-canals, each one is to be treated as a single-rooted tooth, and the same method of procedure is applicable.

Although it is exceedingly desirable to remove every vestige of dead pulp-tissue from the root-canals in this class of teeth, it will be at times attended with difficulty, and again, quite impossible. The buccal roots of the superior molar teeth are very frequently crooked; the canals so tortuous and contracted that the finest Swiss broaches are too large for complete entrance. Contractions are encountered at some distance from the apex of the root and its foramen, succeeded by a widening out towards the latter point, making it physically impossible to clearly reach the apex. These roots being mostly slender, and seldom regularly straight, to enlarge the diameter of the canals with a drill entails the great danger of missing the channel and drilling through the side of the root into the socket, or, perhaps, succeeding but partially,—certainly not bettering, but still further complicating, the troublesome and vexatious situation.

The same or similar difficulties are met with in bicuspids; the roots, if bifurcated, are sometimes compressed in such a manner that the pulp-canals are so perfectly flattened that any instrument, even the most delicate broach, is found to be too thick for entrance. A very fine untempered broach, hammered or planished as thin as possible, with the barbs left on one side or edge, will be found very useful in these cases.

What has been said of bicuspids may also be applied to a great many of the inferior molar teeth. The formation of the roots of these teeth so varies, that if a more detailed description of *all* the singular deviations were to be attempted, this paper would be extended to unreasonable limits.

Not unfrequently the roots of the inferior molars have four distinct root-canals; each root so much compressed perpendicularly from the neck to the apex that the pulp-tissue in the center loses itself into the thinnest membrane, whilst at the buccal and lingual sides of the root a small round canal is found, with an exceedingly small diameter. Again will be seen a similar contraction or compression in the upper third of one or both the roots, transversely; and the pulp, a mere membrane, as it were, at this point, at once opens out again into a kind of flat bag towards the apex.

Let it be borne in mind that in *all inferior teeth*, subjected to treatment after devitalization of pulps, it is *especially desirable* to have all dead tissue removed in the most thorough manner; for, besides the danger of inducing the adverse pathological conditions, before alluded to, by a neglect of this, the laws of gravitation play an important part, and aggravate all subsequent troubles, if any ensue.

When, therefore, it is found to be impossible to remove all *débris* from the canals to be filled, an effort must be made to convert this remaining tissue into an insoluble and harmless compound. What will do this? The profession is somewhat divided on this question; some preferring creasote or carbolic acid, and latterly, salicylic acid, others, nitrate of silver, tannin, and alcohol, etc., while a solution of chloride of zinc also finds its advocates.*

Creasote and carbolic acid are excellent and reliable in their way, but are to be looked upon more as specifics in cases which will be considered hereafter and under a different head.

The failures in preserving the vitality of exposed tooth-pulp by oxychloride of zinc, as formerly applied, have revealed the fact that chloride of zinc in strong solution dries the pulp-tissue and mummifies it. Admitting this as a fact, chloride of zinc would seem to specially recommend itself as an application to root-canals in which a portion of pulp-tissue remains.

For this purpose it has proved invaluable in the hands of the writer. It is applied exactly as creasote would be, and may be repeated every day, or every other day, until four or five applications have been made. In the mean time, at every sitting, efforts to enlarge the contracted canals should be persevered in; and it is astonishing how much may be accomplished by earnest, patient endeavor and the exercise of a little ingenuity in improvising instruments for this purpose.

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* See "Thoughts on Fang-filling." George Watt. *Dental Register of the West*, July, 1859. See "Treatment of Pulp-Cavities and Root-Canals. H. S. Chase, M.D. DENTAL COSMOS, October, 1864.

If sufficient progress has been made in enlarging the canals, considerable portions of the now dried and blackened pulp-tissue will either be brought away by the instruments or will be found attached to the cotton or silk used in the application.

If deemed desirable, the chloride of zinc may be alternated with creasote. There is no special argument to adduce in its favor, unless that it might possibly prevent putrefactive action in the remaining portions of pulp-tissue, and also act as a *future* prophylactic.

Having conducted these preliminary steps with good judgment and care, and finding no soreness about the roots, the general health of the patient being in its normal condition, this class of teeth may now be considered ready for filling.

Owing to the abnormal formation of the roots, and the impossibility of removing the dead pulp-tissue entire from the canals, and the treatment preparatory to filling having been an effort to convert the remaining parts into a harmless substance, the only object in filling such roots at all is to occupy the space remaining above or below the foramen of the root.

It will be apparent to any one that gold, tin, lead, wood, or any other solid substance would be, in these cases, inapplicable; therefore a material must be sought which can be introduced or may be forced —"pumped"—into the narrow and contracted canals.

A thin, almost fluid mixture of the oxychloride of zinc filling is best adapted for this purpose. Although not as fluid as a gutta-percha solution, and somewhat more difficult to handle, it has this great advantage, that it will exert its drying and preserving or mummifying effect upon the tissue remaining, incorporating itself therewith, and preventing any future putrefactive action.

The solution of gutta-percha is also a most excellent material, and may be unhesitatingly employed when the object is merely to "annihilate" space, and where gold or other metallic fillings cannot be used to advantage. This preparation, or rather the mode of using it in these cases, it is claimed, originated with Dr. G. A. Bowman, of St. Louis, and was first presented publicly by Dr. J. H. McKellops, of St. Louis, at the American Dental Association at Niagara Falls.*

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* For further information concerning this method, see original communication by Dr. G. A. Bowman, *Missouri Dental Journal*, vol. viii. No. 10, October, 1876.

Dr. H. S. Chase, editor *Missouri Dental Journal*, has lately recommended an alcoholic solution of gum-shellac as a root-filling, claiming that the shellac immediately hardens when either the fluids of the mouth or water is allowed to come in contact with it. As already remarked, choice may be made of these three different materials. Gutta-percha and the latter are more easily injected into the smallest trace of a root-canal, but have no therapeutic properties; whereas the chloride of zinc is distinctly antiseptic, and for this reason is invaluable in the cases described.

In regard to roots of teeth from which the pulps have been removed entire, and in which the diameter of canals is large enough to admit the free entrance of suitable instruments, it is almost immaterial with what those root-canals are filled, *provided* it is a substance innocuous and indestructible.

The advocates of gold may use this material; so may others also use tin or lead,—whichever can be worked to the best advantage. This will again come up for consideration in connection with the second class of teeth, or those which have lost their vitality through the encroachment of caries, irritation caused by thermal changes in consequence of metallic fillings over exposed pulps, or as the result of oxychloride of zinc fillings.

This subject will be discussed in the next paper.

"GOLD-BUILDING" IN FILLING TEETH.

BY M. H. CHAPPELL, KNIGHTSTOWN, INDIANA.

ALTHOUGH there are diversities of opinion on various professional topics among dentists, all must admit that in the application of principles in the execution of designs is to be found the only hope of true success. And, again, all will agree that the highest order of attainment is to be desired.

Success in any enterprise is, as a rule, not an accident, and none but those concerned have any conception of the labor and anxiety, or of failures, before the ultimate success of the undertaking is reached. When we note the progress of surgical, structural, and prosthetic dental art, we must admit that the pioneers in our profession were engaged in a laborious task, their mistakes and failures preparing the way for those who follow them. Considering the number engaged in the practice of dentistry, we are led to inquire how many are making it a special object to preserve the natural teeth, and what number are engaged in mutilating and disfiguring the face, either through ignorance or from sinister motives.

We must bear in mind that a great number of teeth have been destroyed where honest and earnest attempts have been made to preserve them: pathological conditions, the carelessness of the patient, or the want of thoroughness in the operation, contributing separately or jointly to that end.

In our operations upon the teeth we must not forget that we are dealing with delicate and highly vascular organisms, which are subject to various chemical agencies and to abnormal conditions. Every part of the teeth is subject to chemical and mechanical injury, and to pathological conditions excited or modified by constitutional tendencies.

The destruction of the teeth by *caries* affords an opportunity for both professional skill and artistic ability.

In constructing a dwelling we must have a solid foundation, good material, and workmen who understand the laws of mechanism. Each stone, brick, or timber should be placed so as to give the building its proper proportions and greatest strength. The builder cannot work in a storm, or lay brick or stone in the current of a stream; neither can a dentist work successfully unless he recognizes and obeys the laws of mechanics.

The classes and modifications of cavities, as they are described in our text-books, should be so reduced that the principle of "gold-building" may be applied; sufficient space between the teeth, if on the approximal surface, must be secured to permit the free use of instruments in preparing the cavity, and in the process of building. Quick or slow wedging, or cutting away tooth-structure, may be resorted to as the special case may demand.

Apply the rubber dam securely; *absolute dryness must be secured.*

I will explain the use of the "gold-builders" (see S. S. White's new catalogue, page 376, also *Dental Register*, January, 1875, page 38, and DENTAL COSMOS, November and December, 1876) after a full description of our preparation of the cavity, and consider an operation upon a central incisor with the pulp alive; a very large cavity; decay dark; dentine and enamel dense in structure. Cut away all disintegrated or frail enamel, leaving the surface beveled slightly, so that the enamel rods at the point of union of gold and enamel will be strengthened by the short rods covered by gold. In cases where the dentinal fibrils are calcified (known by the extreme flint-like hardness) enamel may be left unsupported by true dentine, otherwise all enamel must be taken away until it is supported by live dentine. Our reason for this is that the enamel receives nourishment and life from the dentinal fibrils that anastomose at the line of union with the enamel, or there may be an organization and tissue similar to the pulp-cells (odontoblasts) and dentinal fibrils at this juncture; and if there is not a continuous supply of life-force, disintegration, change of color, and failure will be the result; but, as before stated, if calcification has taken place, the results will be satisfactory.

We frequently find a portion of dentine lining the enamel near the cutting edge, at the approximal corner, which in some cases it will do to leave, because of the smallness of the cavity and large anastomosing surface; but, as a rule, where cavities are large, the line of life with the pulp is cut off, and absolute death of the fibrils, dentine, and enamel, and disintegration has occurred or will take place, and may be known by the chalky or white appearance. All this point must come away until direct, or anastomosing communication is reached. If we neglect this we will have a dark line near the joint, especially so at the point near the cutting edge, which will soon break in and cause a failure. To complete our work in the preparation of the cavity, the surface of the enamel must be dressed so as to form a perfect joint, using the engine with disks, or stones, as the case requires, often using strips of sand- or emery-paper, No. 0 or 00; then polish with pumice-stone on soft rubber disks or flat sticks by hand, being careful that the cervical wall be left self-cleansing.

In removing the decayed material, look more to the mechanical construction of the structural work than to an exposure of the pulp, just to see if it is alive; nevertheless, all decayed material should be removed if possible. We must become acquainted with chemical and pathological conditions, that our skill may be of practical value. We must learn how to avoid the necessity for uncovering and imperiling so delicate and highly vascular a structure as the dental pulp. Leave it alone and use antiseptics, such as alcohol or solution of carbolic acid, then drill two pits in the dentine at the cervical wall, diverging to the palatine and labial walls. Cut a shallow canal uniting the pits, then cut canals in the dentine midway between the pulp and enamel on both labial and palatine walls. If considerable tooth-substance is gone at the cutting edge, drill obliquely over the pulp, and remove such parts as will not be well supported with fibril life, protecting the labial plate of enamel as much as possible, to conceal the structural work. After polishing the surfaces, septic treatment and drying, we are ready for the gold, using "rolled gold," No. 30, cut in one-twenty-fourth, one-sixteenth, one-eighth to three-sixteenth inch strips, and instruments of proper shape, as herein described and known as "gold-builders," to wit:

No. 1.—A small point slightly bent half-inch from apex, finely serrated. Used in filling pits, root-canals, and as a holder while using No. 2.

No. 2.—Point same size of No. 1, but a small double curve, as suggested, where the angle in diverging retaining-pits, in approximal cavities, demands the curve. Use similar to No. 1.

No. 3.—Half size to Nos. 4, 5, and 6; also rights and lefts of this No.—½5 and ½6.

No. 4.—Full size of No. 3; a distinct foot-shape, with heel, which is of great value for the purpose designed. The face is at an angle of twenty degrees with the line of the shaft; serrations, one angle at right angles with the face, the other angle at forty-five degrees; each side or edge of the face beveled; two rows of serrations, ten in number; length of face one-sixteenth of an inch. By this peculiar shape of the face and the angle of serrations we get the same force on the gold, bearing it to the canal, dentine or enamel, surface, as the bevel gives to the chisel. Used after the pits are filled, and for building in the canal at the cervical wall, uniting the pits, or after using instrument No. 7; also for building up the structure.

Nos. 5 and 6 are foot-shape, rights and lefts of No. 4. Used in cases where the surface of contact is at an angle with the axis of the instrument, in filling fissures, posterior or anterior approximal cavities, and such places as the angles suggest; ½5 and ½6 are half sizes to these numbers, and mates to No. 3.

No. 7.—A double-heel in shape, face rounding, slight curve of shaft one-fourth inch from face. The serrations are more open than the distinct foot shapes. Used in filling canals at the cervical wall and in fissures.

No. 8.—The face the same in length and angle as the foot-shape, but at a declination from a line of the shaft, or, in other words, "all gone to heel"; serrations same in number and shape as Nos. 4, 5, and 6. Used after Nos. 4, 5, or 6, when the structure comes up near the cusp and the heel of those instruments fails to work in the undercut, as the force applied and the principle of layer upon layer of gold, and the cohesive force must not be changed. Used in posterior surface in bicuspids and molars; also at any place where desired.

No. 9.—A hand-shape, at an inclination from line of shaft of from five to ten degrees, one-quarter inch long, wide face, slightly convex, with five to seven rows of serrations, cut in same manner as No. 7; lengthwise thirty serrations, cut same as No. 4. Used on palatine surface, or at any point where additional metal is necessary, especially at cervical or marginal walls.

No. 10.—A large foot-shape, distinct heel, face convex lengthwise and laterally, five to seven serrations wide and twenty long, making it twice as long as No. 4, and three or four times as wide. Used in cases where rapid work is required, such as the depressions or sulci in molars and bicuspids.

No. 11.—A concave foot-shape, three times as long as No. 4,—fluted serrations lengthwise only. Used on finishing layers of contour fillings.

No. 12.—Convex foot-shape smooth burnisher, for condensing and finishing the last layers, or riveting the gold in waves to the margins and hardening the surface of the metal.

No. 13.—A hand-shape flat burnisher, nearly at right angles with the shaft. The face is three-eighths of an inch long by one-sixteenth of an inch wide,—thin at point. Used similar to No. 12; very useful at cervical wall and on flat surfaces.

(Nos. 3, ½5, ½6, 4, 5, 6. 7, and 8, should be no larger than the retaining canals in building the gold.)

We have very concisely considered the preparation of our cavity and the instruments to be used, believing that many failures are to be attributed to a lack of proper preparation, as well as the want of proper-shaped instruments or carelessness in using them.

Instruments with sharp edges, which will cut through thin layers of gold and injure the dentine or enamel, should be discarded; and even with proper preparation of the cavity for the retention of the filling, as well as to preserve the normal conditions of the tooth, and properly-designed instruments, careful manipulations are necessary for good results.

In annealing gold, or feeding, we should use pliers with points coming together like an ice-carrier, and not use filling instruments or holder. Pass the strip of gold through the outer cone, near the apex of the middle cone of the spirit-lamp flame.

We begin our "gold-building" in one of the pits, commencing with instrument No. 1, with a strip of gold the width of the pit; condense thoroughly with light mallet-stroke by assistant. After both pits are filled unite them with a strip of gold wider than is used in the pits, and use instrument No. 7, if the space will allow, otherwise use No. 3; condense well on the pit points, then run along the canal at the cervical wall and allow the gold to come flush with the surface, and do not condense at the edge until several layers have made the enamel and the foundation corners firm. Continue the building with Nos. 3 or 4, or other numbers, as indicated, in the same manner with each successive layer of gold, keeping it against the wall and in the canal with the heel of the instrument, preserving the contour of the tooth as the building progresses from one wall to the other in the manner of the brick-mason, being careful not to kink the strips of gold. With the metal against the wall the interdigitations made by the serrations will range as seats in an amphitheater, and by this process the metal is held securely in place until the welding force is applied to the instrument, when it becomes a solid mass by cohesive force, free from "seams" or "balling up."

As the contour shape of the tooth is restored, use instrument No.

11 (concave foot) for building on the last layers, condensing and hardening flush with the enamel surface. If there should be a deficiency of metal at any concave surface, at the cervical or marginal wall, use instrument No. 9, which is very adaptable, add the necessary amount, and finish by condensing or burnishing in waves the surface to the point of union of metal and enamel with instrument No. 13, being careful not to allow the instrument to strike the enamel when malleting the wave of gold to that point. By finishing every surface thoroughly with the instruments, in the manner herein described, comparatively little gold is wasted. Cut down with No. 0 or 00 sand- or emery-paper, or tape, and files, if necessary; burnish occasionally and repeat the dressing, and complete with fine stone, burnishers, and buffs, and make as near a perfect polish as possible on enamel and structural work, leaving the tooth and filling self-cleansing.

In filling bicuspids and molars where the cavity extends over the grinding surface, or approximal cavities connected by dark lines through the sulci, or by disintegrated enamel, forming a distinct fissure, do not hesitate to cut out freely through the dark lines or fissures in the sulci, and connect the structural work, shaping the margins as before described. The same principle must be observed in cutting canals and pits to give the greatest strength to the foundation and structure, cutting pits at angles in the crown, and to have all acute angles removed, leaving the enamel and dentine in communication with the life-force—the pulp; no enamel should remain without the support of live dentine, unless the enamel and dentine be calcified.

Anterior and posterior coronal walls should be cut away to permit free access to the cavity. In many cases of the posterior, and sometimes of the anterior cavities, the wall is difficult to follow, and maintain the same force on the metal to the crown surface of the cavity as when commencing at the cervical wall, owing to the lingual or buccal corner projecting; hence for building under and preserving our line of force use instrument No. 8 ("All gone to heel"), until the under-cut is completely filled, then use Nos. 4, 5, 6, or 10, as before described.

In all cases endeavor to reduce modifications and classes, so as to apply the principle of "gold-building."

With small cavities, instruments Nos. 1, 2, 3, ½5, ½6 will do all that is desired.

In building on crowns there is no use for screws, but commence far enough up the canal, if the pulp be dead, cutting canals and anchorages as the case suggests, or if from abrasion the pulp be calcified, and there is reason to believe that the remainder of the pulp-membranes are in as normal condition as the nature of the circumstances permits, cut pits in the dentine in a circle around the pulp-region with a slight canal uniting the pits. If possible, have larger or double pits in the palatine and labial walls, slightly enlarged at the bottom, filling the pits as other retaining-points, and the canals with instrument No. 7; and as soon as the gold will come to the enamel surface use instrument No. 4, keeping the heel to the center of the tooth, or as near so as possible. For rapid work use instrument No. 10; preserve the contour as the filling progresses, condense thoroughly, and you have a solid, dense crown, without any danger of pulling off or breaking at a seam of defective cohesion.

By the guidance of well-known principles in science, and by thoroughness in our art, we can do great service in restoring, preserving, and so preventing the loss of the teeth.

THE APPROPRIATE AND INEVITABLE DECLINE OF MECHANICAL DENTISTRY.

BY PROF. GEORGE T. BARKER, D.D.S.

(Read at meeting of Pennsylvania State Dental Society, held at Minnequa, July 11th, 1877.)

THE thoughts here presented were suggested to my mind by reading a report of the remarks of Prof. D. D. Smith before the American Dental Association, August, 1876, when the subject of Mechanical Dentistry was under consideration (see DENTAL COSMOS, vol. xix. No. 3, page 123). He said, "It might be well to take a retrospect of this branch of dentistry, to see where we stand, and if possible from this time, this centennial year, take a new departure. Mechanical dentistry is in a lamentable condition; it receives no countenance or encouragement from the best men; they have, to use their own expressions, 'washed their hands of it.' . . . There is a demand for mechanical dentistry: many patients are thrown entirely upon its resources. We must supply the demand. We are not always able to preserve the natural organs; in many instances their loss is certain, not alone by decay, but by a disease with which we cannot grapple, viz., absorption of the process and loosening of the teeth. Until we can preserve all teeth, let us not say that mechanical dentistry has no place among our discussions. . . . The appliance, of whatever material it is made, must be fixed in the mouth, must admit of distinct enunciation, restore the features, and be so allied to the natural organs in color, shape, and general character, as not to be readily distinguished as artificial. There is now very frequently an entire want of harmony between the substitutes and the individual. Does not the packing of gold sink into the smallest insignificance compared with true dental prosthesis? Can true restoration be accomplished by the bases and teeth now at hand?" Prof. Smith answers it cannot, the nearest approach being with Allen's continuous gum or metallic plate with rubber attachments.

Upon carefully reading the above partially-quoted report, I was led to ask, Why is it that the "best men have washed their hands of it"? Is it because, as would be inferred from the quotation, the "best men" are ashamed of being mechanics, or of works of their fingers strictly mechanical? are they ignorant and unskilled in *mechanical* dentistry, or is there some deeper and more worthy reason, of which this washing of hands is but the appropriate sequence? It is true, lamentably true, that there is to-day in practice a small body of men who feel proud not to be able to do any mechanical dentistry. They feel ashamed of it because it is a mechanical art, and hence, when their services are demanded for artificial substitutes for their patrons, they respond with deep feeling and dignity, "I do no mechanical dentistry; I am a surgeon, and devote my whole attention to that branch of my profession." I have, however, noticed that this very class manage to divide the profits with the mechanical dentist who does the work, and they will at the same time employ their utmost mechanical skill, often very effectively, to construct some splint for a fracture of the maxilla, by which they may be brought in semi-professional contact with some medical magnate. But the "best men" are not, I believe, actuated by either pretentious pride or conceit, and hence we must look for some other solution than the one just mentioned. It may be asserted that the introduction of the cheap bases has been the cause of the "lamentable condition of mechanical dentistry," but this can hardly be conceded, for the current had commenced to set before the introduction of either rubber or celluloid, and, looking at the subject, it seems to me perfectly natural that it should be so. Every dental substitute introduced by the intelligent and thoughtful operator, is a source of mortification that the art and science he is practicing has failed, either through the patient's neglect or the dentist's want of skill, to preserve organs that were designed to last the lifetime of the individual; and as the thoughtful man recognizes this fact he can no longer expose to view the little glass case that contained the different "show-pieces" which were to be found prominently exposed in the offices of the best men of twenty-five years ago, and which are now banished to the cabinet drawer, to be shown only on demand to those interested. In this action the intelligent dentist but follows the lead of his medical brethren; no surgeon would think for a moment of keeping exposed prominently in his office an assortment of artificial limbs, though all must admit that under some circumstances they are demanded; and the surgeon of to-day will tell us that forty-nine out of every fifty limbs are now preserved that forty years ago would have been amputated by even the best and most cultured operators. This action, the banishing of artificial dental substitutes from public view, is then a healthy evidence, indicating as it does the appropriate and inevitable decline of mechanical dentistry.

There is another reason which should be considered, and it is presented also in the remarks of Prof. Smith when he refers to the restoration of the features, and the necessity for harmony between the substitute and the individual. During the twenty years that I have been in attendance, from time to time, at the dental gatherings, I have heard over and over again, when the subject of mechanical dentistry was under consideration, the necessity of restoration of the human face divine. Like the "pure virgin gold" of the contour operator, it sounds pretty, it is euphonious, and it is sentimental. But is it true? Is there ever a possibility, not to say probability, except in very rare cases, of restoration of natural expression after mutilation of neighboring organs (extraction of teeth)? After an extended experience with gold and silver, fusible metals, rubber, continuous gum, and celluloid, all of which I am happy to say I can put up myself, I have no hesitation in stating that the restoration of natural expression is a conspicuous failure. Nor do I need to confine myself to my own experience, for the "store teeth" of my acquaintances who patronize the most favored operators, whose prices and patrons are both wonderful and numerous, are just as suggestive of artificiality, for the oral muscles play over the porcelain wall with the same automatic action, indicative of want of co-ordination, or rather normal muscular contraction. It will be observed that Prof. Smith, who may justly be looked upon as a representative mechanical dentist, is very careful not to assert that restoration of natural expression can be accomplished by any of the bases now known, but thinks a closer approximation to success can be accomplished by the use of continuous gum, or gold with rubber attachments, and I would add celluloid; but all must in fairness confess that a changed expression is the rule rather than the exception. It is not asserted that this statement will apply with the same force to partial substitutes, but more particularly to entire upper plates or those inserted to supply the loss of the superior anterior teeth, unless the canines remain in position. Many explanations have been given for inability to restore natural expression, the most prominent one being the change which takes place in the insertion of the muscles of expression and the oral muscles, in consequence of the absorption of the alveolar processes, and the consequent alteration in the anterior plate of the superior maxillæ, particularly in the region of the canine fossæ, as at this point several of the muscles of expression have their insertion; but to my mind this explanation is but partial, and we must search for some other solution, and I would present the following views for consideration:

The human system, like a complicated mechanical instrument, is made up of numberless parts, each of which has its appropriate function and use, and when from any cause the mutual relations of parts are interfered with, disturbed, or destroyed, a modification of nutrient action is the result. So with diseased products in the economy, morbid growths occur, or functional or organic changes are induced. If this law holds good, why should not mutilations produce like results, only modified by the vascularity of parts and their functional activity? The changes which occur in the muscles of expression I consider due to the extraction of the anterior teeth, and these changes are modified functional activity and organic structure, and take place most prominently in the following muscles: compressor naris, orbicularis oris, levator labii superioris alæque nasi, levator labii superioris, zygomaticus major and minor, levator anguli oris, and depressor anguli oris.

It may be well to inquire what and by what agencies changes takes place. Immediately at the time of the extraction of teeth there is a shock to the nutrient vessels in the neighborhood, which is not without its modifying influence. To the casual thinker this may seem preposterous, but it is no more wonderful than what comes under our notice almost daily, as, for instance, the marks of mal-nutrition on the anterior teeth, the result of *one* convulsion, or of an accident received during childhood, while the teeth were undergoing the process of calcification, by which for a few moments, or even a second, the harmonious action of each individual cell in the whole economy was suspended, and as a sequence modification of structure is noticeable. Added to the shock, we have left structures which may now be considered foreign bodies, viz., the alveolar processes, and hence there must be functional activity to carry off these foreign products. The increased action of the absorbent system in the neighborhood is also followed by more or less obstruction and obliteration of arterial vessels, they being converted into fibro-cellular material, as in other parts of the body, and as a consequence destruction of their capillary (nutrient) vessels. These influences acting upon the vaso-motor nervous system of the structures in the vicinity will account for the atrophied condition, imperfect muscular contraction and want of co-ordination on the part of the muscles, to which I have referred. If this position be a true one, then it is right to reduce the quantity, not the quality, of artificial substitutes; and it is folly for any one to advance the idea that the "best men" are "washing their hands" of mechanical dentistry from any cause save an honorable desire to preserve natural teeth first and foremost, and that they turn to mechanical dentistry with sorrow and shame, as the medical man does to the barber for the wig for his hairless patient, or to the instrument-maker for the tin horn for his deaf one. He cannot feel proud of it, for it is to him a symbol of the utter failure of his cherished art.

In my remarks I have said nothing of a class of men who ostensibly practice dentistry, who in inserting artificial substitutes show neither taste, skill, nor artistic ability. This class of men is to be found everywhere; they flourish by what they destroy; their places of residence are recognizable by the grinning ceramics, which their patrons exhibit without shame and almost with pride. In this community you will often hear the remark to the dentist, "I am going to let my teeth go, and then have a set that will never give me any trouble." The man who will hear such remarks without rebuking the speaker deserves no place in dentistry, and if he lend his encouragement to it, by saying, "Take gas and have them all out, and come to me for a new set," he deserves something which I will not name in this assembly. To that man, or to all who are destroying in great numbers valuable organs, I would say, Come up higher, come up higher. All diseases of the teeth, with the sole exception of wasting of the alveolar processes, are curable in nearly every instance. We have learned to preserve the pulp, to cure the diseases of the teeth; we can make roots that were troublesome healthy and comfortable; we are making rapid progress in treating successfully atrophy of the alveolar processes; then, am I claiming too much when I assert that the washing of hands by the "best men" is a good sign, and only precedes the hearty handshake over the appropriate and inevitable decline of mechanical dentistry?

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the society, held at the residence of Dr. Wm. Jarvie, Jr., 48 South Oxford Street, Brooklyn, Tuesday evening, March 20th, 1877.

Vice-President Benjamin Lord in the chair.

Incidents of Office Practice.

Dr. Wm. Jarvie, Jr. I have had, recently, two cases in my hands for treatment, which have been very interesting and somewhat instructive. The first one came under my notice last November. The patient (a gentleman) was suffering very severely with periostitis in the central and lateral incisors of the left side of the upper jaw. The sensitiveness was so great that the least touch produced intense pain, and it was several days before I could reduce the inflammation and give ease to the patient. The inflammation extended rapidly, and within ten days there were undoubted indications of necrosed bone on the labial surface of the alveolar processes of those teeth. In the course of time I removed the outer plate of bone over the central and lateral incisors, and the transverse process between the central and lateral. I treated with aromatic sulphuric acid, and from that up to twice that strength, viz., one part acid to four parts water. The case progressed very nicely, the large pocket filling up with soft tissues, when suddenly the new formation collapsed and another siege of inflammation and formation of pus ensued. That gave way to treatment, but there was always an indication of pus, and although there was no dead bone to be found anywhere, still the place did not heal.

Two or three days ago the central incisor again became quite painful. Last evening, after dusk, the patient came to me, the gums looking much inflamed and angry, and the tooth being very loose. In despair of saving the central incisor I removed it, and I think found the cause of my ultimate failure to complete the cure. The crown of the tooth is sound for all practical purposes, having a small filling in the posterior proximate surface; but on the palatine side of the root absorption has taken place, from just above the enamel almost to the apex of the root; in one part of it the absorbed portion is fully one-third the bulk of the root. (The tooth exhibited.)

I showed Dr. Atkinson the tooth just before the meeting commenced, and asked him if he would say a word on it, knowing the condition of the root.

Dr. W. H. Atkinson. It is clearly a case of chemical solution. I do not know why a solvent should be generated there; but after hearing the history of the case I think that the retrograde action of the nourishment of the part, and the inflammation, in some measure accounts for it.

It is evidently not an ordinary case of absorption at all; that is to say, not the result of the formation of a carneous body composed of giant-cells in regular solution, and thus operating as dentinoclasts or osteoclasts,—the tooth-breaking and bone-breaking elements. I have seen a few such cases, but I don't know the immediate cause of them.

Dr. A. H. Brockway. Would you consider this solution a cause or effect of the trouble?

Dr. W. H. Atkinson. I should think it was an effect. It is evidently chemical. If you examine the root you will see that the cavity runs down and leaves something like trabeculas. There is the appearance of undissolved lime left irregularly through the body of the dentine.

Dr. Wm. Jarvie, Jr. The other case referred to is of an entirely different character. Several gentlemen now present saw the case before it was operated upon, and two or three have seen the mouth since. The patient was a lady of about fifty years of age, having an epulo-fibroid tumor occupying the space in the right side of the lower jaw where the second molar formerly was. Last summer the second molar became loose and exceedingly sore, and what the lady called a large gum-boil grew alongside of it. Dreading the dentist, the lady worked at the tooth until she extracted it. For a time everything seemed well. Then this growth commenced, and at the time I saw it, it was about as large as the end of my thumb. It was situated on the top of the alveolar ridge, attached to it by a neck, the neck being hardly a quarter of the diameter of the growth. I removed the tumor with the scissors (Dr. O. E. Hill assisting me), and painted the cut surface with tincture of iodine. About a week from that time, the cut having healed comparatively well, I probed, penetrating to the bone, which I found somewhat rough. I don't think now there was any necrosed bone, but the periosteum was gone and there was caries to a slight extent. I enlarged the opening made through the gum, with cotton having a little creasote upon it, and filled the cavity thus made with sulphuric acid of the strength of one to four of water. The operation was performed about eight weeks ago, and I saw the patient last week. Everything is apparently well. The gums are perfectly healthy and hard. Of course there may be a recurrence of the growth, although there is nothing to indicate it at present.

Dr. O. E. Hill. Did you not remove a piece of bone through the opening in the gum?

Dr. Wm. Jarvie, Jr. I did remove a small piece, which, under the magnifying-glass, could hardly be distinguished—whether a portion of the cementum of the root or the outer shell of the bone, the piece being quite dense and having a polished surface. I thought it was a piece of the outer shell of the bone. The patient was most difficult to deal with. She had been frightened sick, having taken to her bed for a week after a celebrated surgeon of New York had proposed to remove a portion of the jaw and perform quite an extensive operation. She was in such a condition that the first three or four times she was in my office she fainted dead away.

The point in the treatment of the case to which I desire to call your attention is this: Garretson in all such cases recommends cutting to the bone and scraping or cutting away a portion of it. I believe that the simple treatment of sulphuric acid of the strength of one to four of water is much preferable, unless in a case of extensive necrosis. I think this simple treatment is fully as efficacious, and is not anything like so severe.

Dr. E. G. Roy exhibited an upper molar the roots of which were twice their normal size, resulting from exostosis.

The following paper, entitled "Secondary Dentine," by J. Morgan Howe, M.D.S., New York, was read by the author:

In a former paper on secondary dentine, that form of the tissue was considered which has been observed to close an orifice made in the pulp-chamber by destruction of a portion of the surrounding wall, which new tissue protects the pulp, so that thereafter it may perform normal function. It has, I think, been often assumed that if the vitality of the pulp could be conserved, even after diseased action had caused the loss of a portion of that organ, or after a portion had been removed by mechanical means, *this secondary dentinal formation* might still be confidently expected; and further, calcified tissue which has been formed under these conditions has been, it would seem, considered a successful termination of treatment, equally with that formed when the pulp had suffered no such loss. At least, there has generally been no clear distinction made between the tissues formed in the pulp-chamber under these widely different circumstances. As results to be attained, there seems to me to be a great difference in the degree of desirability of these structures, both of which may be called secondary dentine; but when we consider the process of the formation of primary dentine, and the relation which the secondary formation first spoken of bears to the original structure, it will, I think, be evident that the expectation that a *peripheral plate of dentine* can and will be formed to close an orifice and *protect a pulp*, after loss of a portion of the organ, is not well founded.

We are prepared to admit that all reparative processes are more or less perfect as they approximate to the normal type in formative process and in structure, and we have seen that secondary dentine, which will serve the purpose stated, is, like the primary tissue, the result of formative activity in the dentinal cells called odontoblasts, disposed in a continuous layer on the periphery of the pulp. Exactly how the formation of dentine is accomplished is somewhat a matter of dispute, but the weight of authority is with the view stated and indorsed by Mr. C. S. Tomes in his "Manual of Dental Anatomy": "by the direct conversion of the odontoblast cells, and by them alone," the dentinal fibrils, the dentinal sheaths, and the matrix between these latter being three stages in the conversion of the same substance, the dentinal fibrils being processes of the cells. The odontoblasts, when stimulated by exposure of the fibrils or of the pulp itself, renew their formative function, and we have as a result the secondary deposition, continuous with the primary dentine, which Salter has, I think, aptly designated "dentine of repair." Wedl describes the continuity of the fibrils from the new into the older structure, and the anatomy of the new dentine approaching more or less nearly to that of the old. It is evident, I think, that the process of this formation is in a very low degree morbid, and in its most perfect form removed only in time and quantity from physiological action. But after the tooth-pulp, from any cause, has lost a portion of its periphery, the odontoblasts being removed, it has been known to recover such a condition as to cause no further trouble, and the tooth thereafter been a useful organ. It is a matter of record, also, that calcified tissue called secondary dentine has been formed in the pulp-chamber after the occurrence of such loss of pulp-substance; and this result has frequently been attributed to the same causes, and claimed as a success, it would seem, equally with the first-described deposit. Indeed, Tomes says,* "Reparative efforts are not always productive of favorable results; instead of calcification of the superficial parts of the pulp, several, or even many, independent centers of calcification may be established within its substance," thus apparently classing the different forms of calcareous deposits together as produced by the same causes. And Salter, also, although in "Guy's Hospital Reports" (*N. Y. Dent. Recorder*, 1856) he draws a clear distinction between the osteodentine of intrinsic calcification and dentine of repair in their anatomy, and as being the results of entirely different processes, yet in his "Pathology and Surgery" he attributes intrinsic calcification, dentine excrescence or nodules, and dentine of repair to the same causes, although he here also defines the difference in structure and result of the different formations.

Wedl, however, says that the osteodentine of calcification of the pulp, formed after chronic inflammation and ulceration, *follows atrophy*, which sometimes occurs as a result of chronic inflammation, and that this tissue is formed by a grouping of bone-cells, while dentine of repair is composed mostly of dentine. He quotes E. Muhlreiter, who also "considers the new formation of dentine and the calcifications as independent processes." This view seems to be, probably, the correct one; it agrees with our idea of the condition in which a tooth-pulp is likely to be if it survives at all, inflammatory action; and the result is similar in many respects to what we know takes place in extreme old age, when the tissues lose some of their vital power and nutrition is not as active as formerly; but whether calcification of a pulp which has lost its peripheral cells is always a sequence of an atrophic condition, or a recuperation of vitality sometimes occurs, after chronic inflammation, sufficient to cause the formation of this tissue by a process more nearly resembling a truly reparative one, the result is very much the same, for although the cells and nuclei within the pulp itself have the power under certain conditions of appropriating lime from the blood, and thus forming calcified tissue, there is nothing, I think, to show that they are in a condition, either of development or arrangement, to form dentine which shall be so disposed or attached to the primary structure as to serve the purpose which is the object of our desire, that is, the *protection of a pulp.* The results of pulp-calcification may indeed be called reparative, for the tooth is restored to a comfortable and useful condition, *if*, during the process, the nerves be not impinged so as to cause pain; but as a result to be compared to a peripheral plate of dentine *protecting* a pulp, it must be considered far less desirable; in every case of calcification of the pulp itself the power of sustaining the vitality of the dentine must be much abridged, probably in proportion to the completeness of the process; for if the process becomes complete the organ as such is obliterated, and we have only the best kind of a root-filling. Any condition of the pulp, when merely a modicum of vitality is conserved, is no doubt a gain over complete devitalization, but if Wedl is correct as to the atrophic condition of the pulp preceding calcification, even this advantage may be questioned; and in either case it must be so slight, and the result by so small a degree removed from the complete filling of the root with a foreign substance, as hardly to warrant the taking of much risk, or subjecting the patient to great pain or inconvenience, to secure it. The probability of securing this result (calcification) after inflammation and loss of a part of the pulp, is not, I think, so great as that complete disorganization will ultimately follow, although the proportion of favorable to unfavorable results is mere matter of conjecture. If the view here presented, however, is a correct one, success will have secured very little advantage to the patient, while in the cases in which we fail much trouble, expense, and pain are incurred for the accomplishment of that of which we had no means of forming an intelligent prognosis. When the periphery of the pulp remains, and we have the cells whose formative activity produces dentine, I think we may expect reparative tissue in proportion as we can expect normal function, or an approximation to it, in the deeper portions of the pulp; but when these cells are removed, the conditions, whatever they may be, which induce the deposition of lime in the deeper portions of the pulp, must be in a much greater degree morbid, and so uncertain as to give us little cause for cherishing "great expectations." With the fact in view that the patient is greater than the tooth, will we not, if our premises are correct, be rendering the best service, in cases of exposure with loss of a portion of the pulp (the odontoblasts), by removing the remainder of the pulp and thoroughly filling the cavity whence it came?

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* Tomes's "Dental Surgery."

Dr. W. H. Atkinson. I am not in a condition to speak to-night at all, but rather than let the paper go entirely by default I will make a few remarks.

In the first place, let me compliment Dr. Howe upon the modest and concise *résumé* he has given us of what authors say upon the subject; and, lest he should be unduly elated by commendation, I will give a word of caution about coming to a judgment without its being sufficiently warranted by a knowledge of the processes that take place. His last sentence was suggestive of the thought in his own mind, that extirpation was preferable to an effort at inducing calcific deposit. If we knew more about the intimate molecular changes concerned in this process we might be entitled to speak more positively. Authors and observers are still at loggerheads as to the process of the formation of dentine. I believe all agree that dentinoplasts are the factors of calcification of the dentine. But whether they exist in a series of alternations of generation that bud one from the other, the elder ones calcifying and the younger ones being prepared to take on the lime-salts, and in their turn be calcified to construct the dentine, as some assert, or whether there is but one stratum of dentinoplasts which secrete the lime, exude it from their peripheral end, and gradually recede down the line of the dentinal tubuli, and still keep up a continuity of deposit of lime, so that the interdentinal tissue is now the result of the calcification of the lime exuded from the peripheral end of the dentinoplast, leaving the fiber, called a process, still uncalcified, which we call the dentinal fiber, about which there has been such discussion as to whether it is capable of performing nervous functions, and whether it can be properly called nerve, or whether it is only a neural mass capable of conducting the waves that constitute sensation; these are the main points that must be settled before we can talk intelligently about this process. So far as its anterior anatomical history is concerned, it would be premature for us to decide as for one view against the other until further investigations have been made and recorded. I could detail my apprehension of the views of the different histologists who have dealt with this subject, and give my acquiescence or dissent, or leave entirely without comment their statements, all of which might be a means of preparing our minds to grasp this fine subject. It is not a territory so large that we can drive a coach and six through it. We must needs be supplied with optical instruments to enable our eye to outline the bodies about which we are talking.

Now as to the regularity or irregularity of the deposition, and whether there is a difference of the incitement to the laying down of lime-salts in what is called the "dentine of repair," and the formation of "pulp-stones," depends entirely upon a full understanding of the significance of the terms we use. There is but one possible method of getting a calcification: that is, to have a quantity of lime-salts in a solution sufficiently rich to admit of the crystals seizing the molecules and depositing them side by side in such close proximity as to leave them a solid lime-rock.

That is as truly so where there is a portion of pulp left uncalcified as in the true dentine, or in the secondary dentine, or in the pulp-stone, which has no dentinal fibrils at all in it. The vessels are there, and throw out the lime-salts. Why the pulp-stones should be free, and in greater excess in certain points than in others, is not clearly understood. It has been referred to what is called vital action rather than chemical action; chemical action being referred to the mineral kingdom entirely, and, as naturalists and physicists have said, the inorganic kingdom.

The paper refers to one point which I wish to elaborate a little. The assertion is made that the best possible root-filling would be a complete calcification of the pulp. That would be exactly right were such a thing possible. Under what circumstances is it possible, and under what is it not possible? In the human organization it is not possible; in the herbivora it is possible. And now we have to refer back to the reasons and the groundwork and pillar of truth respecting this process,—to the fact which I have already remarked upon as to whether there is successive production of dentinoplasts so as to fill up the pulp-cavity completely. So far as real dentine is concerned that is true; but when we come to the secondary dentine we always find a portion of the pulp that is not capable of being fully calcified, which leaves a little uncalcified track that will occupy the space that the pulp did before calcification was carried to the secondary extent, and leaves a little fragment of pulp composed of its normal tissues. That is what I have offered fifty dollars for in gold,—a complete calcification of the human tooth, so that when you cut it across there would be no remnant of the uncalcified pulp-substance.

Now you perceive that we are dealing with the question whether there are two kinds of calcification or not. There certainly cannot be two kinds of calcification, but there may be different modes of calcification, and if our nomenclature were properly arranged we would understand each other better upon this subject. We would say that the formation of dentinoplasts and the deposits of lime in them was one mode of calcification, and that we call primary dentine. Then the secondary dentine is that which is the result of ageing of the tooth, where the continuous deposit of lime-salts renders the size of the pulp-chamber smaller, with a reduction in the number of dentinal fibrils. Then we have what is called the dentine of repair, which seems to be another form of secondary dentine. Then, again, we have the calcification of portions of the pulp proper, and that has been called pulp-stones. This is caused by the deposition of lime-salts, which takes place outside of any of the constituent elements of the pulp. Here we may learn that a calcified nodule becomes a nucleus around which lime deposits without the necessity of a remnant of uncalcified material being left, such as would present us with a dentinal fibril either tortuous or straight, whether there was the remnant of a dentinoplast or not. But you perceive that I have not yet provided for lime between the cells, so that the pabulum of the dentine would be all that was charged with lime-salts. I have seen many cases where the pulps were completely beaded from the place where the beads form in the pulp-chamber proper, and continue into the root-canals of the tooth. Sometimes this calcification goes on so that those which were originally distinct may fuse together, and after cutting we see the lines of calcification like so many layers of a transverse section of an onion, and that would be the distinctive difference between pulp-stone and calcification of the kind that we denominate secondary dentine.

Dr. E. A. Bogue. May I ask of Dr. Atkinson a little clearer answer to the question raised by the last remark made in the paper,—that the "peripheral cells of the pulp alone can be relied upon for the deposit of dentinal matter over an exposed pulp"? Is this the case? or may we pretty confidently expect such a deposition to take place even when a portion of the pulp has been excised or otherwise got rid of?

Dr. W. H. Atkinson. I am glad that that point has been recalled, for I am aware that, as a rule, we do not pin our minds closely enough to these points to catch all the links, and it is like the insidiousness of error to slip in sideways.

The doctor's question is equivalent to asking whether there would be dentinification. It would not be dentinification if it was simply calcification,—that is, when the dentine is simple calcification of the dentinoplasts. But that is not to say that the periphery of the pulp shall not be protected by simple deposition of lime-salts between the cells,—between the dentinoplasts and the other cells which constitute the active tissue and the vascular and nervous portions of the pulp.

My own experience has been such that I would never despair of the deposit of lime, so as to get a protection of the balance of the pulp, so long as there was a living pulp in a healthy condition.

If I am clearly apprehended, I think that is all that is necessary for me to say.

The following paper, entitled "New Method of Pivoting Teeth," by W. G. A. Bonwill, D.D.S., Philadelphia, was read by the secretary:

The mere mention of "pivot tooth" recalls unpleasant memories. One had as well take up the subject of mechanical dentistry if he desires to court the opprobrium of high-toned scientific gentlemen.

At the expense of a frown I will venture to give you the result of four or five years' practice in this line, which, with an occasional exception, has resulted in a system, entirely new, so far as I know, and which has rendered me the greatest satisfaction, since it adds another link in the chain of conservative practice and one of the greatest comforts to frail humanity.

No one of any experience can deny that there is need of some plan whereby we can preserve the usefulness of teeth which have succumbed to caries, accident, or the *gross carelessness of the majority of dentists*, in the premature loss of their crowns. So great is this destruction, especially among the bicuspids and molars, after they have been filled and refilled by the best operators until there is little left save a thin, destructible wall or walls, that there has seemed a necessity that some plan should be devised to preserve the root or roots, without the disadvantage of a plate for one, three, or more teeth,—a plan which would not involve unpleasant odor or taste, and which should possess the usefulness and permanency of the natural organ, and which should be so cheap as to be within the reach of all, and so simple that any one of any pretensions could perform the operation.

It is hardly worth the time to recall any of the processes hitherto made use of. I will mention that performed by my friend, Dr. M. H. Webb. So far as artistic beauty and elegant manipulation of gold foil is concerned, nothing can be urged against it. But when we consider its cost, the unusual skill necessary, and the great risk of fracture of the face without any chance of repair without the loss of the whole operation, and the fact that not more than five per cent. of dentists could, or would if they could, practically construct it, and that it meets but one class of cases,—the superior incisors,—it seems impossible that such a practice can become useful and meet the *great* demand now for such a mechanism.

I will call your attention to another plan, that of Dr. Foster, of Boston. In this you have a porcelain crown similar to mine, but with a long screw running through the crown and driven into a block of wood placed in the root. This is easily done with incisors, but it offers no resistance to thorough mastication; the wood will swell, the thread will break, and the bone go on to caries. Now, what can I offer to you that is any better? Let us see; and before any one shall declare against it, let him use a little common sense, and I think the plan will speak for itself.

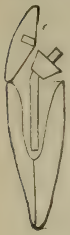
Something has got to be done to meet this shameful waste and disfigurement, and bring us under the axiom in art, "The beauty of art is to conceal art," and wipe out the shame that is upon us,—the wanton destruction of so many teeth because it is easier to replace them upon a plate.

The plan I have adopted renders the pivoting of a bicuspid or molar in either jaw, as easy as placing in the centrals, and just as secure.

You are all well aware that there is no surer way of uniting permanently and securely two pieces of wood or iron than by a bolt and nut. If it is desirable to secure to a rock any other substance, we will first place a bolt in the rock, held by some cement, then upon a thread cut on the outer end screw a nut; not reverse the bolt and put the threaded part in the lead. The great desideratum in pivoting any tooth is to first secure a pin or bolt with a head thereon, into the pulp-canal so firmly as to insure against its being drawn from its place. Next to this in importance is to imbed the bolt with some cement that not only fastens it, but precludes the possibility of future decay about it, and which will so face that portion of the root next to the artificial crown as to forbid the secretions of the mouth entering, and at the same time give solid basis to the crown. To this we must add a nut on the bolt to hold the crown in position, which nut can be removed at pleasure in case of fracture of the crown, or made tighter should the tooth be strained beyond measure.

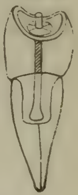
To perform the operation we will first take an incisor. Take an impression before removing the crown and fit to the cast a plate-tooth with pins crosswise. Grind off the base of the tooth on the palatine side from the pins to its cervix, that we may have more room for the hole through the base of the crown nearer the center, and that the nut may be of sufficient size for strength. (See Fig. 1.) Grind the tooth to fit the cast, allowing for cutting under the free margin of the gum to conceal the joint; fasten it in position and place gold backing thereon. To fit the concavity of the root, simply form a strip of gold with a round tool on a piece of lead, without getting up special zinc and lead dies. You can fit the base just as well with a pair of round-nosed pliers. This is all done in a few minutes and the job is ready to be soldered. Add strips of gold to fill in, so as to make the palatine surface similar to a natural tooth, which gives greater strength and allows of countersinking for the nut. With the dental engine the hole is made in the base of gold, at an obtuse angle (see cut), for inserting the bolt or pin; countersink on palatine side for the nut, which should be tried in the countersink that it may turn easily and fit closely at the same time. It is now ready to be fitted to the natural root, presuming that the pulp-canal has been treated

FIG. 1.



and no danger to be apprehended from closing up the foramen. The facing of the root of course you will do with the corundum wheel and engine. Drill well into the root and have the cavity no larger in diameter than is necessary to give room to pack around the pin. Removing much of tooth-substance only weakens it unnecessarily. Bevel at the margin of the gum, that no part of the bone may be uncovered when the crown is placed on. Let the root be ever so solid and perfect, I never rely upon a pin screwed into the dentine. Always make the canal of such shape and size around the pin as to allow of packing about it such substance as I shall name.

FIG. 2.



If the gum is weeping, chloride of zinc or perchloride of iron will soon check it for our purposes. No need of the dam.

This case being an incisor, most of the fitting is done to the cast in the laboratory, except the accurate fitting to the concave surface of the natural root, which is but a trifling matter. Everything being now in readiness, the pin is next to be secured in position. It is made either of gold or platinum. The latter should always be used when amalgam is the means for securing it. The pin has a small, flat head at one end, to prevent its being pulled out or turned around, which would be the case if a thread alone were relied upon. Place the pin in the canal, and at the cervical margin, or where the pin passes through the base of the artificial crown, bend it at an obtuse angle, sufficient to allow the incisor to sit squarely upon the root. Before securing the pin, cut it off, leaving it a little longer than is necessary, the length being ascertained by placing the crown over the pin while it is in the root. Now take a French screw-plate, and cut upon the outer end or the part passing through the base of the crown, a thread as far down as the angle. Lay the pin again in the hole in the crown to see that it is still large enough for it, as cutting the thread increases the diameter. You are now ready for the permanent insertion of the pin. How is it to be held?

I said above, the screw is *never* to be depended on alone. If the walls are very frail, insert by screwing or simply pushing high up in the canal the pin, which should be flattened in some portion of it, where cement comes in contact, to keep it from turning. Ordinarily, a flat head answers.

If the pin is hard to retain in the root while you are temporarily getting its right position with the crown thereon, a little gutta-percha on the headed end will stay it. Subsequently it may be removed, and then—what? So far, well. You may all agree with me up to this point. As to the next procedure, not many, I presume, will be willing to go so far, since the majority never use the article that I am proud to mention.

Amalgam! Yes, I use amalgam, and let me tell you that the operator who does not use it has neither the good of the profession at heart, nor that of humanity. I thank God that I overruled my early education years ago, and know that I have done a great service to my patients, and know still further that I have entailed not half, nay, not one-tenth, the suffering or expense that I would have done, had I not used it.

The amalgam I mix with as little mercury as possible, so that the mass can be washed well with water and bicarbonate of soda. Yes, I wash amalgam, and, if called upon, can say why. Press with large pliers until the mass is formed into a block that, when broken, breaks at sharp angles.

It may be well to say that a gold pin should not be used in connection with amalgam. Platinum only will resist the affinity. Gold would be broken down and lose its consistency, and become amalgamated itself. Therefore use platinum.

Pack the amalgam around the pin, from base to cervical margin, leaving room enough between it and the crown for a layer of gutta-percha, which should always cover the whole face of the root to prevent further decay. In the majority of cases of incisors I now allow the amalgam to make the base in direct contact with the gold soldered on the crown, first coating the gold with varnish or wax, to prevent amalgamation, then a thin layer of gutta-percha when finally screwed on. With the bicuspids and molars I very seldom place gutta-percha, allowing amalgam to fill up even to some distance below the gum in cases of fracture or decayed condition of the walls. It is well to try the crown once or twice while placing in the amalgam, so as to have the pin in proper relation with crown and root. This done, you can wait until the next day for the amalgam to become hard, simply covering the pin with gutta-percha, or, as I do generally, place the crown on and press it firmly home, and secure it temporarily with gutta-percha passed gently around the pin on the outside of the crown, where the nut is to be placed. But little loosening of the pin ever occurs before placing on the nut. If it does, it is a very easy thing, before screwing up finally, to press some amalgam about the pin, which firmly fixes it. Patient may return the next day at a convenient hour, when the nut may be placed on, and, with a forked screw-driver, driven home.

I neglected to mention that the nut should be made at same time the pin is, that the same sized hole in the screw plate should be used to secure a perfect fit. It is well to specify that the thickness of the nut should be about one-sixteenth of an inch, with the slot for the screw-driver cut crucially, as the nut can be manipulated much easier. With incisors, the nut being nicely countersunk, will finish up with the gold backing very well, without covering with gutta-percha or oxychloride, which I do with the bicuspids and molars.

I now fill around the tooth with oxychloride, or amalgam can be used where there is much wear.

Where I insert two or more teeth at the same time, and in continuous arch, I cut off one at a time and get that one in true position and secured before proceeding to the next, which insures a better arch. The teeth, having been first fitted to a cast, will not require much alteration while being fitted to the root.

In some cases where the walls are worthless, and where a portion has been lost below the margin of the gum, I use amalgam exclusively, without gutta-percha as an intermediate. The crown, which, with bicuspids and molars, is all porcelain, will admit of contact with amalgam, and by grasping it with the fingers, or, when possible, with a pair of forceps, it is worked down and nicely imbedded into the amalgam, as you see in the sample bicuspid.

I have succeeded with roots when very much of the continuity has been lost. If the pin in such cases is well anchored far into the root, success is sure.

When inserting bicuspids and molars in either jaw I seldom take an impression, but fit the crown immediately to the root and get the articulation with the opposite teeth correctly. Let it be a trifle short, as the amalgam intervening will make up.

The pin in these teeth should be a trifle shorter, that it may not be disturbed when the jaws are closed. Look well to this. If the straight screw-driver will not reach such cases, then have on hand one at right-angles to the handle; if the slots in the nut are cut crucially, but a quarter of a circle is needed for the screw-driver, and it can be used from the front of the mouth instead of from above, as with the straight driver.

You naturally ask, where comes in the rubber dam? *No use for it in any of these cases.* If there is any discharge of serum or blood, it is easily stanched, and as it requires but a few moments for the insertion of the amalgam, the operation need never get wet. And what if it does now and then? Let me say that the root below the crown is always full of moisture, and could not absorb sufficient to cause any real difference to the operation, if your amalgam has been very hardly pressed, inasmuch as this metal absorbs no moisture, having no affinity for water, being only wet on the surface, which can be dried, and hard pressure against the wall of the cavity drives off all water.

By this plan any tooth, superior or inferior, can be pivoted and made almost as secure as the natural organ.

A very thin washer of gold or platinum should be used between the porcelain tooth and the nut, to insure the nut's slipping smoothly when tightened by the screw-driver. It is not needed with the incisors when backed with gold.

For inferior incisors and cuspidati I do not use the nut, but after securing the platinum pin with the amalgam in the root place the crown on with shellac or gutta-percha. In such cases this is secure, and can be resorted to with superior incisors with ordinary pivot-teeth where cheapness is an object.

In backing the inferior incisors a small tube can be soldered on to the backing for the pin in the root, which can be made nearly the full length of the crown, and saves drilling so deep a hole with the engine; and so with many cases of superior incisors where the overbite does not interfere. For perfect security, however, I prefer to use the nut when admissible, which it is in every case except inferior incisors; and amalgam in every case for securing the pin.

In adjusting the platinum pin to roots of superior molars it can be bent from the lingual root, into which it is deeply placed, over to the hole in the crown, and then bent again to go squarely through it. In the lower molars the pin is inserted in the palatal root and bent forward to suit the hole in the crown.

I now find that where the thread is cut the full length of the pin, and the pin flattened a little where inserted in the root, no head is needed. The pin can be grasped with a pair of forceps and pushed firmly up into the root.

It is not necessary for me to assure you of my success in pivoting teeth which were never pivoted before with any security. Your own common sense and observation will convince you after seeing this simple principle of physics applied,—the bolt, nut, and the power of the screw will convince you. Where these will not hold, nothing else can.

It is well just here to say that the cutting of screws and making of nuts and taps, is one of the simplest mechanical achievements. A fine screw-plate is all that is needed. With it you can make your own taps of steel for making nuts, and with the burring engine and proper drills you can make your pins and nuts and paraphernalia for doing the same at odd hours, and without any outside assistance, or they could all be prepared and kept in the depots.

The nut is not to be covered at once, as it may need in a few days a slight tightening, as is the case at first with all nuts. After this the oxychloride will hold it from turning, and keep it clean. If any accident happens to these cases, it is no trouble to remove the nut and replace with a duplicate tooth, and return again, adding fresh oxychloride.

The time consumed in a single case where gold backing is used need not be more than three hours, and with the bicuspids and molars about two hours. No other operations that I have ever performed have rendered such satisfaction to my patients.

There are many ways by which the crown may be secured after the platinum pin has been fixed firmly in the root with amalgam. Shellac, oxychloride, and gutta-percha will fasten it without nut and thread.

Where the root-canal is very much enlarged, and the patient is not able to have a crown secured in this manner,—with nut and thread,—then fill up the root with amalgam and, when hardened, drill out a hole for a wooden pivot. This makes a very firm case.

I feel that to the perfection of such work two things are particularly necessary—amalgam and the bolt and nut.

This plan may be modified in many ways to meet special cases, which the ingenuity of the operator will suggest.

There are forms of artificial teeth which would answer far better and be very much stronger, which will be placed in the market after due trial.

One thing should be mentioned here: if the incisors are so placed in as to leave no shoulder or point of contact or occlusion for lower incisors, the root will in time come down very much, and reveal the joint. This should be borne in mind, as it may save the operation of replacing.

The minutiæ in the mechanical part of this operation I shall presume upon the operator's knowing without a suggestion.

I believe I have given you all that is needed in the performance of what will prove to be a very simple achievement, and one that will render you more satisfaction than building up with gold or amalgam the most elegant crown, which latter is not "art concealing art." The crown, as I have shown you, cannot be told in any way from the natural tooth. It gives me great pleasure, therefore, to reveal to you this very simple plan, and I trust you may find on trial that I have not exaggerated it in the least.

Dr. A. H. Brockway. I think the thanks of the society are due to Dr. Bonwill for his paper describing an ingenious and, it seems to me, a sensible method of pivoting teeth. I quite agree with him that there are many cases where a pivot-tooth is altogether preferable to the expensive operations which would otherwise be required in gold. I thought when the plan suggested by Dr. Foster, of Boston, was introduced, that it promised something good, and I had some tooth-crowns made for the purpose; but a trial did not prove very satisfactory. Whether it was the fault of my manipulations or the fault of the system itself I will not say. It strikes me, however, that the plan of Dr. Bonwill is, in theory at least, far superior, and I for one shall be anxious to put it into practice on the first occasion.

Dr. E. A. Bogue. I saw some teeth set after this fashion some two or two and a half years ago, when in Dr. Bonwill's office, and since then I have set a number of them. I think the first such operation that I made is something like a year old, but I most unqualifiedly give it my approval. It struck me as the paper was being read that there were one or two points a little obscure, and with your permission I will speak of them. Dr. Bonwill speaks of inserting a screw into the root, and making one side of the head of the screw like a foot. He means, of course, that the orifice in the root shall be made like a boot; the screw-heads being then inserted, the toe is inserted into the toe of the boot, the filling being put in between the heel and the wall of the canal; it is impossible to pull out such a thing as that. The filling may be of any material you like.

Again, he spoke of a crucial slot in the head of the screw. That may be all clear enough as you carefully look at the nut in the specimen passed around. It is simply for convenience in turning, so that the screw-driver may be more easily applied, and one does not have to turn the nut so far at once.

I did not find Dr. Foster's plan to work well; I did not find our manufacturers in this country were able to give such teeth as would stand the strain put upon them by that plan. I got a few teeth from England, called tube teeth, which I suppose are known to all. These have answered my purpose admirably. To be sure, I used up a corundum point, or perhaps two, every time I set one of these teeth, in counter-sinking for the nuts; but I am well compensated for that by the success of the operation. I would suggest that perhaps if we sent to Mr. Ash for his tube teeth, and used them extensively enough, our friend S. S. White might be induced to make such teeth as we want. The strength of our teeth is not to be compared in the same day with the English teeth. And after cutting these teeth into any shape you like, they may be polished again almost as perfectly as though the enamel had not been taken off.

Dr. J. M. Howe. I think that Dr. Bonwill in his paper has shown us, very nicely worked out, a sensible plan for pivoting teeth. There are some objections to it that occur to me, because I have tried the same plan and found it not entirely successful. I only tried it once, and it was so unsuccessful that I have not tried it again. About two years ago I had an inferior cuspid root on which I wished to set an artificial crown, and an idea almost exactly similar to this struck me, but of course it was not worked out in the detail that Dr. Bonwill has explained. I fitted a plate-tooth to fix on that root with the screw, exactly as in that lateral incisor (referring to the specimen). I used a square nut instead of a round one. I did not have any foot on my wire that extended into the root, but merely notched the wire and fastened it in with amalgam. When I was almost ready to put the tooth on, a difficulty occurred which I think will occur very frequently. Dr. Bonwill has got over it by bending the pin. The difficulty is that the thickness of the plate tooth will almost always interfere with the position of the pin in the center of the root, and it will be necessary in almost every case to bend the pin at an angle, and even then in small roots it will be very difficult, indeed, I think, to get the pin far enough over to cut out a place for the nut without cutting away the backing close up to the tooth. I was so enthusiastic over the idea after I had made that tooth and put it on, that I sent to England and got some of Mr. Ash's tube teeth, and I have them all yet. The tooth that I put on this inferior cuspid root loosened in about six months, and I took it off and tightened it again, but it was not successful.

I think Dr. Bonwill has worked out the details of his plan very nicely ; and in many cases, especially with bicuspids and molars, using tube teeth, I have no doubt it would be a very permanent operation. But it seems to me that in small lateral roots, or inferior roots, there would be the difficulty I speak of. I do not know that the bending of the pin would be a serious objection in most cases, but I think it is somewhat of an objection ever to bend the pin, and the necessity of it perhaps is an objection to the use of that system in setting them on the incisor roots.

Adjourned.

NEBRASKA STATE DENTAL ASSOCIATION.

The annual meeting of the Nebraska State Dental Society convened at Lincoln, Tuesday, July 24th, 1877.

The following essays were read and discussed : "Dental Hygiene," by Dr. Sanborn ; "Our Wards," Dr. Roseman ; "Sympathetic and Reflex Influences between the Teeth and other Organs," Dr. King.

The election of officers resulted as follows :

President.—Dr. S. H. King, Lincoln.

Vice-President.—Dr. D. A. Vance, Kearney.

Corresponding Secretary.—Dr. J. W. Chadduck, Nebraska City.

Secretary and Treasurer.—Dr. W. F. Roseman, Fremont.

Executive Committee.—Dr. A. S. Billings, T. C. Kern, W. F. Roseman.

Committee on Membership.—J. W. Chadduck, D. A. Vance, J. F. Sanborn.

Adjourned to meet at Fremont the fourth Tuesday in July, 1878.

W. F. Roseman, *Recording Secretary.*

BIBLIOGRAPHICAL.

THE PRACTITIONER'S REFERENCE BOOK. ADAPTED TO THE USE OF THE PHYSICIAN, THE PHARMACIST, AND THE STUDENT. By RICHARD J. DUNGLISON, M.D. Philadelphia: Lindsay & Blakiston, 1877.

This octavo volume of three hundred and forty pages presents in a compact and accessible form practical information, suggestions, and rules concerning medicine, pharmacy, and hygiene, which every professional man will find adapted to his needs; affording information on a great variety of subjects not otherwise attainable except by reference to numerous professional treatises. No compend hitherto published has embraced so much intelligently-selected and carefully-condensed matter of every-day value; and not alone the professional man, but every educated gentleman and lady, will find plain and reliable instruction in this volume on many topics, to which certainly every head of a family will find frequent occasion to refer,—dietetic rules and precepts, directions for preventing the spread of infectious diseases, disinfectants and their application, prompt treatment of poisoning, rules for management of infants during the hot season, eruption of the teeth, etc.

We commend the book as eminently satisfactory, both in scope and detail.

OBITUARY.

BROOKE DAVIS, D.D.S.

DR. BROOKE DAVIS died of inflammation of the bowels at Pottstown, Pennsylvania, July 21st, 1877, in the thirty-fourth year of his age.

Dr. Davis was a graduate of the Philadelphia Dental College; was possessed of those attributes which make up a true manly character; was a true and noble friend; a thoroughly honest, conscientious practitioner, and one of our very best operators.

Through the death of Dr. Davis his wife and sons and other relatives sustain an irreparable loss, and dentistry is deprived of one of its bright jewels.

MARSHALL H. WEBB.

PERISCOPE.

TIC DOULOUREUX.—We all know what an intractable disease is neuralgia in all its forms, and particularly that known by the name of "tic douloureux" or facial neuralgia. In a case of the latter affection, under the care of Professor Peter, which had lasted more than twenty-five years, the patient having latterly as many as two hundred paroxysms a day, this physician has obtained rapid and marked success by the internal administration of the bromide of potassium. The patient, who is a workman, had gone the round of the hospitals of Paris, where he derived but temporary relief from the various forms of treatment to which he had been subjected. Professor Peter, looking upon tic douloureux as a neuralgia of the epileptiform type, in which he has simply followed the teaching of his respected master Trousseau, resolved upon trying the effects of the above-named drug, which is considered almost a specific against epileptic fits. On the first day of the patient in hospital, he administered six grammes of the salt, and, at the visit the following morning, the patient declared that he slept throughout the night,—a thing he had not done for at least ten days previously. The medicine was continued daily at the same strength, and, on the fourth day, the fits had entirely disappeared. Pushing the analogy between the two affections still further, M. Peter advised the patient to continue the medicine for a certain length of time, as follows: during the first month, six grammes a day; during the second month, four grammes a day; and during the third month, two grammes a day. The patient has already taken the bromide of potassium for a month, without any return of the tic douloureux.

Professor Gubler lately brought to the notice of the Société de Thérapeutique a case of facial neuralgia that he had successfully treated with aconitine. The patient had been under the care of several physicians, but, not being able to obtain more than temporary relief, resolved to place himself in the hands of a surgeon. This surgeon was the late M. Nélaton, who carefully divided all the nervous filaments concerned in the disease, but with only temporary relief, as, after a time, the patient's sufferings were as great as ever. M. Gubler prescribed five milligrammes of aconitine per diem, and, in a few days, the patient was to all appearances cured, as he was entirely free from pain. M. Gubler, however, does not consider the patient completely cured; he does not believe in the curability of long-standing neuralgia, as in such a case the malady is evidently the result of structural alterations in the nerve itself. It is in simple neuralgia, and particularly in the congestive form, that M. Gubler has found the preparations of aconite produce something like a permanent cure.

In a case at the Hôtel Dieu, Professor Sée is trying the effects of salicylate of soda. The patient is about 60, and, ever since the age of 30, he had been suffering more or less continuously from tic douloureux. After the first day of the administration of the salt, of which he had taken eight grammes, the patient was relieved of all pain. It is now about a week since he began the medicine, of which he has taken the same quantity daily, and up till now he has no return of the paroxysms to which he had been so long subject; but M. Sée thinks it would be as yet premature to consider the case a permanent cure.

By a curious coincidence, on a visit to the Lariboisère Hospital in the same week, I was shown a patient in M. Tillaux's ward on whom he had performed resection of the superior maxillary nerve, just at its exit at the infra-orbital foramen. He removed nearly half an inch of the nerve, and the reason he assigned for this was that, by this method, the chances of a radical cure would be greater than simple division of the nerve or filaments affected; but what if the diseased condition of the nerve extended beyond the parts visible? For my part, I doubt the rationality of this treatment, as I have met with cases of signal failure. In the present instance, the patient is a woman of about 40, and the malady about nine years' standing. She certainly feels great relief from the operation, but time alone will decide whether the cure is permanent or not.—*Paris Correspondence of British Medical Journal.*

Radical Cure of Neuralgia of the Lower Dental Nerve.—On July 25th, 1876, a woman was admitted into M. Terrillon's ward at the Hospital St. Antoine. Since January, 1875, she had been subject to attacks of neuralgia in the course of the right inferior dental nerve. The least touch, the action of speaking, of carrying a glass to the mouth, of mastication, increased the paroxysms of pain, which radiated along the lower jaw as far back as the ear. The patient, worn out by pain, and eating only with great apprehension, got thinner day by day, and sought assistance from surgery, as she had tried in vain all the medical resources used in similar cases.

The diagnosis was easily established. M. Terrillon was convinced that the neuralgia was simple, *i.e.*, of peripheric origin. There was no cerebral mischief, and pressure on the nerve diminished the pain. The neuralgia was localized to the inferior dental nerve along its course, for the mental nerve was the point of departure of the pain, and the contact of the teeth with cold water and food caused acute suffering. M. Terrillon resolved to divide the dental nerve, after the method of M. Michel, of Nancy, an operation which has for its object the cutting of the nerve before it joins the dental trunk of the inferior maxillary. The patient, not wishing to be rendered insensible, was placed in a chair before a window. M. Terrillon introduced into the mouth a double gag, which, depressing the tongue, gave room and light. A vertical incision, running from the last superior molar to the inferior, divided the buccal mucous membrane as far as the anterior border of the tendon of the temporal. With the finger and a canulated sound a way is made between the internal pterygoid and the branch of the inferior maxillary. After a little time the ridge of Spix,* situated at the opening of the dental canal, is felt,—the nerve is there, and M. Terrillon proceeds to divide it.

It is impossible, in spite of the employment of sponges and cold water, to see the bottom of the wound. He is prevented from taking up the nerve with a hook, and immediately performing resection, as some authors advise. "Having, then, my finger on the ridge," says M. Terrillon, "I try with a tenotome to cut the nerve-trunk on the inner side of the jaw, but my finger is so fast that I abandon this project, after many trials. The opening of the jaws producing tension of the internal pterygoid muscle, I remove the gag. Then, introducing the finger, I feel that it penetrates the wound more easily. I slide in the tenotome and perform section exactly on the branch rising above the ridge, without going too much in front or behind through fear of embracing the lingual in the section. At the moment of this procedure the patient uttered a slight cry, and a little jet of blood sprung into the mouth." The nerve being cut, the patient felt relieved. The day after the operation it was clear that sensibility to touch, temperature, and to pain was abolished in the whole extent of the region of the chin. The patient left the hospital on August 6th, and was seen by M. Terrillon on November 18th. She had then all the appearance of health, contrasting singularly with her anæmic condition on her entrance to hospital. She declared she had not suffered any pain since the operation.

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* Spix described and illustrated a point of ossification, forming the internal border of the dental canal. M. Cruveilhier says he has seen in a fœtus of fifty or sixty days a plate of bone which might correspond with Spix's observations, and that the ridge which crowns the dental canal is nothing else but the internal extremity of this plate.—Cruveilhier, *Anat. Descriptive*, tom. i. page 85.

M. Terrillon offers the following observations and conclusions: (*a*) Section of the inferior dental nerve is indicated in all cases, when the neuralgia lasts many months, when it resists general medical treatment, and when the health of the patient suffers. (*b*) The operation should be performed as high as possible on the course of the nerve; thus recurrence will be less likely. (*c*) The method of Michel, consisting of section of the nerve before its entry into the dental canal by an incision made at the bottom of the mouth, should be preferred. It offers the advantages of not injuring any important part, of freedom against accident, of not leaving any external mark, and of not having been, up to the present, followed by recurrence. (*d*) This operation presents one inconvenience; it is a delicate one with all subjects, and difficult with many; but yet he can always manage to perform section. (*e*) Simple section ought to suffice in the great majority of cases. (*f*) Resection, which does not seem indispensable, still ought to be employed, with the aid of a special hook, when the wound is sufficiently large, and not too dry, so that the nerve can be easily seized.

Will the neuralgia recur? M. Létiévant, an authority in such matters, says in his work on Nervous Section, 1873: "A comparison of facts teaches us that recurrence after section of the dental nerve takes place, especially in the first days of the operation; sometimes in the first month, rarely after a longer time." Cures which have passed over the first weeks ought to be considered as definite. In the case of M. Terrillon, the recovery, having now lasted more than four months, ought to be considered as definite.—*Medical Examiner, from Bulletin de Thérapeutique.*

Division of the Parotid Duct.—A clean-cut wound of the cheek entering into the mouth and including a complete severance of the parotid duct is so uncommon an occurrence that it may fairly be considered a peculiar surgical case, and its subsequent treatment combined with its simplicity an unusual success. The cut merely is of secondary importance, and most likely would, without any interference on our part, naturally heal of itself; the real difficulty with which we have to contend is the injury to the duct, and to that must we devote our undivided attention. Now, in order to take up as little space in your columns as possible, I will endeavor to be as explicit and succinct in the details as the case will allow.

The patient, an engineer, whilst attending to his duties in the engine-room, fell and struck the left side of his face against a sharp edge of a part of the machinery, inflicting almost a transverse cut on the cheek, about an inch and a half in length, having the appearance as if done with a razor, and of course wounding some of the small arteries which are situated so numerously, and which ramify so extensively in this part. The orbicularis oris muscle fortunately was undivided, for, supposing the contrary had taken place, my patient's speedy recovery doubtless would have been much retarded by such a complication. The wound; nearly the whole of its length, opened into the mouth, and the parotid duct was entirely severed; and on this rests the peculiarity and the real interest of the case. As the wound bled very freely I applied to it some matico, which modified the bleeding considerably, rendering it unnecessary to apply torsion to the small branches of the different arteries which were injured. I now brought the edges of the wound close together by means of interrupted silk sutures; so far so good, as concerns the wound itself. But what I must confess gave me a little anxiety was, how to deal with the divided duct, knowing that the dribbling of the saliva over the cheek would prove a very great hindrance to the healing process; so, by way of experiment, I touched the edges of the wound with the solid nitrate of silver, and kept it exposed to the air. The next day I saw my patient, a great amount of inflammation had been set up; however, there was not such a flow of saliva as I had expected, so I was tempted to continue the application of the caustic, being well aware that it could not do harm, and that good results might accrue. This dribbling continued for several days, and I was beginning to get apprehensive that a salivary fistula might form, which I should have found somewhat difficult to have overcome. However, I still persevered with the nitrate of silver, applying it twice a day, when to my relief I perceived the dribbling of the saliva was being gradually arrested, and at the end of ten days it ceased altogether.

The wound now presented such a healthy appearance, and was so firmly cicatrizing, that I removed the sutures, and at the end of the fortnight my patient was able to take solid food.

Some very useful hints may be derived from the happy results of this case, which might be serviceable in any future accident of a similar kind,—the simplicity of treatment saving most likely the necessity of a plastic operation, the somewhat surprising rapidity with which the wound healed and so easily overcoming the ill effects of saliva, the setting up of a counter-inflammation resulting from the application of the nitrate of silver, thereby putting quite a different phase on the case, and which *may* have had the effect of counteracting the saliva and causing adhesion of the wound to take place, notwithstanding the deleterious action of that secretion; although the duct was divided, the wound nevertheless healed by the first intention, which most probably resulted from this counter-inflammation. The primary application of the matico might have had some beneficial effects as regards the remarkable quickness with which the wound healed, which, in my opinion, is rather unprecedented.—*E. Marlett Boddy, L.R.C.S., in Medical Press and Circular.*

TUMOR OF THE LOWER JAW REMOVED WITHOUT EXTERNAL WOUND.—When we saw this patient a week after the operation, it would not have been easy for any one unacquainted with the case to discover anything amiss, except a little swelling in the right cheek. She looked well, was free from pain, could talk without much difficulty, and could move the lower jaw fairly well.

For the following notes we are indebted to Mr. E. J. Havens.

Ellen M——, aged thirty-three, was admitted June 4th. About December last, the patient first noticed a small swelling of the gum, near the back teeth, on the right side of the lower jaw. She thought it was merely a gum-boil; it was neither tender nor painful, and its color was of a reddish tint. When the tumor had been growing for about two months, the patient sought advice of her doctor, who strangulated it with catgut, and a piece of the growth came away. This operation was performed a second time, and another piece removed. After this two decayed teeth were extracted. The skin opposite the seat of the tumor had been painted three times daily with tincture of iodine, which seemed to retard the growth. The mass was always hard, and the patient could even masticate portions of her food on this side. Occasionally it bled a little.

On admission, the right cheek of the patient bulged outwardly, and, on looking into the mouth, a reddish growth, the size of a large walnut, occupying the site of the molar teeth, was visible. It was painless, hard, and smooth, much resembling gum-tissue.

On June 6th, the patient being under the influence of an anæsthetic, and conveniently placed in a dentist's chair, the mouth was held open with a gag. A knife with a rounded end, guided by the tip of the left forefinger, was made to divide the soft parts over the anterior margin of the ramus just about its junction with the base of the bone, and then the periosteum and muscular attachments on both sides were separated with a raspatory. The bone was next partially divided with a small saw, and the section was completed with cutting forceps. The second bicuspid tooth, displaced by the growth, was now extracted, and the body of the bone was cut perpendicularly at this spot by means of the saw and the forceps. After the knife had been passed along both sides of the fragment to divide the mucous membrane and other structures down to the bone, the raspatory and forefingers then completed the operation. Thus the tumor and fragment of bone, stripped of the periosteum, came away in one piece. The facial vessels were not divided, and the bleeding was unimportant, no artery requiring ligature.

Remarks.—Mr. Maunder said such was the usual history of a case of fibrous epulis. It was benign, but recurred unless the bone surface whence it grew was also removed. Further, the growth was generally pedunculated, but in this instance it was sessile. Seven years ago (March 9th, 1870) he had, he said, demonstrated in that theater the feasibility of removing, without external wound, large lateral portions of the lower jaw, the seat of tumor. The patient on that occasion was ten years of age, referred to him by Mr. Owen, of Leatherhead. From that child he had taken away an extent of bone comprised between the middle of the left ramus and the site of the right canine tooth. The second case similarly treated was sent up by Dr. Dove, of Pinner. Both patients have since been often seen in capital health, and he felt justified in stating "that the practice of our art will have one horror less for a patient, who can be assured that no unsightly scar will disfigure his face."* He need scarcely suggest that the face of the female should be most scrupulously saved from disfigurement. Neither was it necessary to point out the distinctive characters of the above operation as compared with that of a comparatively trivial kind for the extraction of a sequestrum already nearly accomplished by nature. Fifteen years ago he had seen the late Mr. John Adams remove the whole lower jaw in a state of necrosis; and three years ago he (Mr. Maunder) had taken away in one piece rather more than the body of this bone, necrosed. Both patients were getting new bone generated as a substitute for the original, at the date of operation.—*London Hospital Reports, in Lancet.*

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* C. F. Maunder on "Tumor of Lateral Portions of Lower Jaw removed without External Wound," 1874.

EXTIRPATION OF THE SUBMAXILLARY GLAND: SALIVATION.—J. M., aged nineteen, grocer's apprentice, of lymphatic temperament, but fairly healthy, consulted me on account of "a lump" on the right side of the neck below the jaw. The "lump" had been rubbed by an old woman (who enjoys a certain surgical reputation), and had been galvanized by an advertising practitioner. It had existed for two years, was painless, growing slowly, and freely movable. On the 23d March I removed it, under carbolic spray, by a linear incision parallel with the lower border of the lower jaw. The deep cervical fascia was pinched up by a pair of forceps, and incised sufficiently to allow a flat director to be passed between it and the gland, when the incision was carefully extended. The surface of the gland was smooth, measuring two inches and three-quarters in its long axis, and an inch and one-sixteenth in its short axis; its shape was not unlike that of a potato. It was easily enucleated by the finger and thumb-nail. The slight hemorrhage that occurred was easily stayed by pressure with a sponge. The cavity was then partially filled with antiseptic catgut, snipped up in order to entangle a clot which would afterwards become organized, and prevent a depression being observable after healing. The edges of the wound were brought together by catgut sutures, and the gauze and protective dressing were used. There was no rise in pulse or temperature, or change in appetite or sleep, at any time after the operation; only on the second day there was very marked salivation; the third day this symptom had disappeared. The wound was perfectly healed in a few days, leaving a faint bluish linear cicatrix, and the marks of the two catgut stitches which were not taken out; the part imbedded in living tissue being absorbed, and the free ends falling off into the dressing. The tumor was examined by Mr. Knowsley Thornton, and found to belong to the class lympho-sarcoma. The only explanation of the salivation that has occurred to me is, that the irritation to the sympathetic and nerves connected with the submaxillary ganglion may have caused by reflex action an increased secretion by the remaining salivary glands.—*Ernest Sheaf, F.R.C.S.E., in Lancet.*

CHONDROMA OF THE SUBMAXILLARY GLAND.—Mr. Butlin exhibited this specimen, from a girl of fifteen, in whom a tumor had been growing for four years after commencing as a small nodule without apparent cause. When seen, a large mass projected under and over the jaw, from the position of the submaxillary gland. It was easily removed by operation, being encapsulated; and was then found to be cartilaginous in structure, like the ordinary growths from the parotid gland, containing also bundles of fibrous tissue and remains of acini and apparently of ducts. The growth was, therefore, in all probability, a specimen of cartilaginous tumor of the submaxillary gland, from its position and from the remains of gland-tissue it contained. No similar case had been recorded in the Transactions of the society; and although Virchow spoke of cartilaginous tumors as uncommon in salivary glands except the parotid and submaxillary, Mr. Butlin could find but four recorded examples of the disease in the latter situation. Virchow believed that these tumors had their origin in an injury to the gland; and for this reason they ought to be most common in the parotid, and least common in the sublingual glands. In the lachrymal glands cartilaginous tumors were very uncommon indeed.

Mr. Rushton Parker, of Liverpool, spoke on the position and origin of these tumors, and on the acinous structures which they are believed to contain. He had found true gland-structure in a specimen from the parotid region. In another example of the disease a small tumor was removed by operation from the neighborhood of the angle of the jaw. Although this simulated a submaxillary tumor in position, the submaxillary gland was found in its place, and the wound revealed a portion of the parotid which had evidently been dragged down into this unusual situation by the weight of the tumor connected with it. With respect to the origin of these cartilaginous tumors of the glands, some pathologists had referred them to displacement of the cartilage of Meckel; but they more probably arose from the connective tissue of the gland, and an intermediate tissue between the latter and cartilage might be sometimes found in a kind of myxomatous element in them.

Mr. Doran said that the cartilage of Meckel could hardly be the source of these enchondromatous tumors, for the former was derived from the mesoblast, while the gland-elements were derived from the epiblast. Further, if derived from the cartilage, the tumors should appear at an earlier period of life.

Mr. Butlin replied, and remarked that the theory of the origin of these tumors in Meckel's cartilage was first raised by Luschka.—*Pathological Society's (of London) Reports, in Medical Times and Gazette.*

Cyst of the Upper Jaw.—A man twenty-four years of age presented a fluctuating swelling of the size of a walnut on the right side of the face, half an inch below the orbit. In the mouth, the tumor projected along the outer margin of the gum; it was fluctuating and not painful. This had been noticed during the last two and a half years, and had been lanced twice, when "stuff like coffee-grounds" is said to have been evacuated, but the wound was not kept open. Adjacent to the tumor was a carious biscuspid which had not been tender, but the man had some face-ache three years ago,—*i.e.*, before the formation of the cyst. The canine tooth was absent on this side, the lateral incisor being in contact with the bicuspid, and there was no history of its extraction; possibly then the cyst may be dentigerous. There was no discharge from the nose or other sign of disease of the antrum. A seton was then passed through the cyst from the mouth, by means of a curved needle, and a clear, slightly yellow mucoid fluid was evacuated. A crater of bone was then felt surrounding the cyst at its base. Probably the adjacent carious tooth will have to be extracted. A radical measure would be to lay the cyst freely open and stuff it with lint. A finger in the cyst would enable the diagnosis to be confirmed.

A young woman came under treatment a month ago with a mucous cyst of the upper jaw of two or three years' growth, producing considerable deformity. It had previously been lanced two or three times. A seton was inserted and tied in; clear mucoid matter exuded, suppuration followed; a carious tooth adjacent was then extracted. The patient is now free of all trouble but a depression in the maxillary bone.—*Guy's Hospital Reports, in British Medical Journal.*

To TAKE RUST OUT OF STEEL.—Place the article in a bowl containing kerosene oil, or wrap the steel up in a soft cloth well saturated with kerosene; let it remain twenty-four hours, or longer; then scour the rusty spots with brickdust. If badly rusted, use salt wet with hot vinegar; after scouring, rinse every particle of brickdust or salt off with boiling water; dry thoroughly; then polish off with a clean flannel cloth and a little sweet oil.—*Scientific American.*

NECROSIS OF THE SUPERIOR MAXILLA FOLLOWING SMALLPOX.—A girl, six years old, contracted smallpox three months ago. A month from the onset, two teeth fell out and the breath became foul. About an inch of the alveolar process necrosed, became exposed, and was taken away with the greatest ease. Such a form of necrosis may follow after exanthemata.—*Guy's Hospital Reports, in British Medical Journal.*

HINTS AND QUERIES.

"HE that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WILL not some one give the details of finishing gold fillings after condensing the same,—the burnishing and polishing?—COUNTRY.

WILL some one please tell me how I can obviate the following difficulty?

There is nearly always a space between the teeth and the plate after it is vulcanized and finished. Some of the blocks are often loose, and single teeth are nearly always so.

I am very careful to remove the wax from the teeth. I do that by pouring hot water on them. I have tried every remedy I can think of, but have failed. —E. T.

I SHOULD like to inquire through the medium of your pages, of some more experienced practitioner than myself, the best mode of bleaching discolored teeth. Any light on the subject will be greatly appreciated by A STUDENT.

WILL some one tell me the best way to insert lower plates when little or no ridge is visible; also the best material to use in such cases?—DENS.

I SEEK for light to guide me in the treatment of the following case.

Mr. B., between thirty and thirty-five years of age, applied to me a few weeks since for treatment of diseased antrum, from which he has suffered more or less for nine years; a discharge of offensive matter through the left nostril troubling him most of the time. He has twice been treated for this affection within the last five years, without benefit. At each time a tooth was extracted, followed by a discharge of offensive matter through its socket. Treatment each time was continued for a few weeks, and then abandoned. I extracted the second molar, the only remaining tooth (behind the canine); then, with a straight trocar, I perforated the antrum. I was somewhat disappointed, upon withdrawing the instrument, to find no discharge of matter through the opening I had made. I injected tepid water with some force into the antrum; a discharge through the left nostril of a thick, clotted, offensive matter was the result. After thoroughly cleansing the cavity by repeated injections of water, I threw into it a mild solution of the sulphate of zinc; then, inserting a pledget of lint into the opening, I dismissed the patient, with instructions to remove the pledget and syringe out the cavity twice every day.

Saw patient on the second day following. Again injected tepid water, when a discharge similar to the first was the result. Three days later I repeated the injection, and, although I threw it into the antrum with considerable force, I could produce no discharge; the water would not even pass through; the nasal opening was evidently closed. Patient complained of a feeling of fullness and a deep-seated pain beneath the left eye. The disease is evidently located in the anterior part of the antrum. The patient is a farm laborer in moderately good health. What shall I do with the case?—J. F. H.

M. M. J., who asks how to remove a broken instrument from the root of a tooth, is recommended to try suction. It can often be accomplished with a syringe.—A. C. Deputy, *Noblesville, Ind.*

W. A. S. will experience a satisfactory result, I have no doubt, by observing strictly the following mode of restoring discolored teeth to their normal translucency: First make an opening into the canal of the affected tooth from its palatine surface (if any inflammation exists, this must be reduced, as a matter of course), then fill it (the canal) in the usual manner with os-artificiel, or some other non-conducting substance. This accomplished, proceed to remove all decay in the pulp-chamber and cavity proper. With a syringe, one or two drops of a saturated solution of oxalic acid in pure water are placed directly into the pulp-chamber; it is allowed to remain from three to six minutes, and its effects are watched from the face of the tooth. As soon as the dark color has nearly cleared away, the pulp-cavity and tooth are to be thoroughly washed with *warm water alone*, and, if time will allow, filled with dry chalk for a day or two; or if an immediate termination of the operation is desirable, omit the chalk, and let the entire pulp-cavity, lower corona and all, be carefully and accurately filled with oxychloride of zinc, which can most easily be accomplished by having the inside of the cavity moistened with the fluid as before directed, and absorbing all surplus from the surface of the filling.

I am indebted to Dr. E. A. Bogue, of New York, for this plan, a much fuller explanation of which can be seen by referring to Dental Cosmos of January, 1872, page 2. I have adopted the above mode in a few instances, and have been much pleased with the result.—J. A. Chapple, D.D.S., *Lagrange, Ga.*

Answer to S. T. W., who inquires why continuous-gum teeth on being removed from the furnace have a sand-paper-like appearance. In continuous-gum work, as a matter of strength, as well as to retain the teeth in proper position while the body is being fused, the set is imbedded in plaster and asbestos, and a continuous band fitted against the backs of the teeth, the long pins being bent down over this band and soldered with pure gold. This is generally done in the muffle, and, if heated to too high a temperature, fuses the enamel of the teeth, which, being in contact with the plaster, becomes "etched," resembling in appearance ordinary window-glass when roughened or "etched." To guard against this, and to obviate other difficulties in this beautiful and wholesome artificial denture, S. T. W. is referred to my essay on "Continuous-Gum Work," to be found in the "Embellished Transactions of the American Dental Convention," for sale by S. S. White.—AMBLER TEES, D.D.S.

PERMIT me to explain to C. R. Taylor that my opinion regarding the red and inflamed condition of the tissues so often met with where artificial dentures of vulcanite were worn was largely based upon the result of "other men's experience,"—careful and intelligent men, too,—such observers as the late Professors Wildman and Austen (see last edition of "Harris's Principles and Practice"). Six years ago, in order if possible to discover what the cause of the abnormal condition alluded to really was, I consulted a number of members of the profession; I made a careful record of what they gave me as their experience; in addition to this, I closely observed cases in my own practice; and, lastly, I made a series of experiments with vermilion in order to discover under what conditions active qualities might be developed in it.

The result of all this was that I found that the red and inflamed condition of the tissues of the mouth was met with in connection with any of the bases in use, whether vulcanite, celluloid, gold, or silver. I observed it in mouths where gold was worn, red rubber, black rubber, and celluloid; that it more frequently occurred in vulcanite cases (irrespective of color, however), which may be accounted for by the fact that the surfaces of these bases coming directly in contact with the tissues are very often roughened, and consequently add to the irritation.

I cannot but express surprise at the statement of Dr. Taylor "that these abnormal conditions of the mucous membrane seem to have resulted from wearing vulcanite, the tissues recovering immediately when a celluloid plate was substituted." He is apparently ignorant of the fact that the coloring agent in celluloid is vermilion. He tells us that he has always believed that the trouble was due to the presence of vermilion; admitting, however, that it is not from the elimination of mercury, but from catalysis, which he apparently thinks signifies contact. If that were the correct sense in which to use this word I could heartily agree with him, as I have seen scores of vulcanite cases so rough and unfinished upon the palatine surface, in consequence of inequalities in the plaster cast, that mere contact was sufficient to keep the tissues in a state of irritation. Catalysis, however, does not mean contact; it means the action of presence, and is used to designate any reaction the *rationale* of which is not understood, as in the case of manganese dioxide, which, when added to potassium chlorate, and heated, causes a rapid decomposition of that compound. In the earlier days of chemistry this word was more frequently used than at present, and was a convenient way of disposing of reactions not understood. Students of the present day, however, have less need for the word, and are not disposed to shelve by its use so important a subject as the one in question, but, on the contrary, to get at the bottom facts of cause and effect by patient investigation.—C. J. ESSIG.

REPLY TO CHARCOAL.—It is to be remarked that charcoal, like the double-edged blade known as a catling, is for good or for evil, according as direction is given it.

The composition of a tooth-powder is to accord with the demands of a case for which it is prescribed. To employ a common preparation, having no regard to the indications of the very various requirements met with in the mouths of patients, is to secure a good through accident alone.

Charcoal, as a dentifrice, commends itself as being disinfectant, absorbent, and antiputrescent. It is a powerful oxidizer of animal *débris*. It will make a foul mouth pure, and will go farther than almost any other agent to destroy the fungiferous growths so destructive to the dental organism. The objection to its use lies in an inability on the part of the mucous secretion to dissolve it; hence, if imprudently used, it is found not only to make a lodgment within the festoon of the gum, thus making a line of discoloration, but what is of even greater consequence, it will provoke a chronic inflammatory action in the periodontium, which results not unfrequently in the loosening of the teeth.

A very little charcoal goes a great way. The agent is not to be used as the base of a powder: not as a cleanser of the teeth. It is to be prescribed for its chemical, not for its gritty property. As a cutter-away of discolorations, cuttle-fish bone commends itself as superior. Charcoal is combined in such a base with a different intention altogether.

In the cases presenting spongy gums, charcoal demands to be used with the greatest caution; where these parts are firm and strongly adherent to the teeth, more freedom may be exercised. That a very little charcoal will disinfect a very great deal of decomposing animal matter is illustrated by a variety of experiments. Among these experiments, one by Dr. John Turnbull, of Glasgow, may be instanced. In a box, having the bottom covered by a few inches of pulverized coal, this physician laid the carcasses of two fair-sized dogs; over the bodies was laid enough of the powder to cover them. This box was kept in the laboratory for a space of six months, no odor being at any time perceptible. At the end of that time the case was opened, and found to contain little beside the bones of the animals; decomposition had progressed, but putrescence had been antagonized.

Of the different forms of charcoal, that made from the twigs of young willow is to have preference for use about the mouth. Of this a minimum quantity is found to do a maximum of disinfection. Another form, one that is most clear of the objection of insolubility, is a kind prepared by burning blood in combination with chalk. Still another form is that derived from burnt bread.

As it is to be inferred that there are gradations in the solubility both of the carbo ligni and animalis, it is to be inferred that preference in use will arise out of the indications of a given case. The rule lies here: under ordinary circumstances selection is to be made of the willow coals; exceptionally, burnt blood, or burnt glue, or the burnt white of eggs, or the ashes of bread will be found to answer a better purpose.

Of the carbo ligni, one drachm to two ounces of a base that may be selected is generally quite sufficient for the purpose of its intention. In such proportion, the instances must be rare indeed where other than good results arise out of its addition to a powder.

To put the matter in a single sentence—it is to be accepted that charcoal, finely pulverized, is among the best of dentifrices, but that it is objectionable because it is insoluble in the fluids of the mouth.—O. P.

Answer to R. J. H., in April Cosmos.—The subject of treatment of alveolar abscess discharging through the tooth is of such magnitude that to discuss it thoroughly would take more space than would be allowed. But take a case, for instance (one of the most common), of abscess on buccal roots of superior first molar; cavity of decay mesial and crown. First put on dam, and with your engine cut back until you can get into each of the roots from the cavity; remove all decayed dentine, and wash out with syringe and solution of salicylic acid in alcohol, then, with a probe (I use a nerve broach with the barbs off), find the length and direction of the fangs, then take a Gates drill and drill them out to the apex as near as possible, then with a bit of cotton on a broach thoroughly saturate and force out at the apex, if possible, solution of salicylic acid or carbolic acid or creasote, or even a solution of iodine and creasote, then dry with hot air, and close up with Hill's stopping. Now it depends on how long the abscess has existed, the condition of your patient, and the thoroughness of your treatment, whether you will have to remove the temporary filling or not before you are ready to fill the roots. The probabilities are that you will. Should there be a dull ache gradually increasing, indicating an accumulation of pus, remove the temporary filling, syringe out with either of the preparations mentioned above (I prefer the first), and again force it with broach and cotton into every part of the fangs, and dry out as before. Then, unless there was a profuse discharge when you opened it, mix a little oxychloride of zinc thin and saturate a *small* pledget of cotton with it, and force it just to the cut of the root, close up as before. Generally this will be sufficient. After a month fill the fangs, then close up again for a while, then finish filling the crown. Sometimes it will require frequent attention, and in old cases it is almost impossible to cure. The treatment, of course, must be varied according to conditions and circumstances, but the general treatment is to get away all decomposing tissues, hard or soft, to correct foul conditions, and relieve (mechanically) the pressure produced by pus, or, which is more troublesome, by the gases generated by decomposition, and let nature complete the cure.—M. C. S.

RIGGS'S DISEASE (SO CALLED).—I copy the following from "Robertson's Treatise on the Human Teeth," published in London, 1839. The extracts are taken from the chapter entitled, "Loss of the Teeth from Tartar and from Inflammation of the Periosteum." "The principal exciting cause of the disease above mentioned is the accumulation of a calcareous substance called tartar, which is deposited upon the necks of the teeth. . . . The necks of the teeth being most exempt from the friction of the food and the action of the surrounding muscles, they are accordingly the parts on which this substance first begins to concrete; and, moreover, in these situations it finds a resting place in the furrows produced by the abrupt termination of the enamel and the free edge of the gum. A deposit once established forms a basis for a further deposition, and, one layer being successively added to another, the accumulation goes on, gradually increasing and insinuating itself below the edges of the gums, thereby detaching them from their connection with the necks of the teeth, and at the same time producing an irritable and spongy state of these parts, which are subject to bleed upon the slightest application of the tooth-brush.

"As the tartar increases in quantity it progressively takes possession of more and more of the fangs, causing the gum, the socket, and the membrane to retreat before it until it excites inflammation in the periosteum, and then, in consequence of the acute pain occasioned, the tooth must be extracted; or should this not be the case, the tartar takes possession of the whole of the fang, and then the tooth losing its support drops out of itself."

Now whatever credit may be due to Dr. Riggs, and I think there is much due, for giving to the profession the only set of instruments which has yet been devised for the thorough treatment of the difficulty, is the Riggs's disease (so called) anything more or less than is depicted by Dr. Robertson in the above extracts?—Q. V.

A CASE IN PRACTICE.—A young lady, about nineteen years of age, called to consult me in reference to a large and painful swelling in the right ear. She had been suffering intense pain for about three weeks, and, thinking the trouble might proceed from a defective tooth, had applied to me for relief. On examination of the mouth, I found an exposed nerve in the superior second molar, on the same side as the affected ear. There was nothing abnormal about the Eustachian tube or any of the adjacent parts. Externally, the ear was very much inflamed, painful to the touch, and swollen. I suggested that the trouble might *possibly* come from the decayed tooth, and advised its extraction. To this she would not consent, and begged that the nerve might be destroyed. Considering her debilitated condition, I yielded a reluctant consent, made application of nerve-paste, and discharged her.

In the evening I was sent for by the patient to know if she might not remove the cotton from the tooth, as she was suffering intensely, not only in the tooth, but in the ear also. Attributing this pain to the action of the nerve-paste, I sent her word not to remove the cotton, and that the pain would soon subside. On seeing her next morning she stated that she had followed my directions with the result predicted, viz., cessation of pain in the tooth. Almost immediately afterwards an abscess broke in her ear, succeeded by a copious discharge of blood and pus, with instant and marked relief of pain. At this sitting her ear was very much improved, not only by a diminution of pain, but of the redness and swelling also. She has had no further trouble, and is rapidly recovering health and strength.

Could there have been any connection between the tooth and ear-trouble, or was the latter a coincidence?—F. F. DREW, D.D.S., *Baltimore, Md.*

AN ARTIFICIAL DENTURE PRODUCING NAUSEA AND VOMITING.—Mr. D. C. P., aged sixty-one years, American, of nervo-bilious temperament, has worn an upper artificial denture for eight years, and has daily experienced the most disagreeable nauseating effects from it. Many days he is obliged to remove the plate twenty times during the day to prevent vomiting. He has had several plates, all of which have been constructed with a view of overcoming these highly unpleasant sensations. At present he wears a plate which covers only the alveolar ridge, but with no better results. A remarkable feature in this case is, that while Mr. P. was attending the Centennial Exhibition last summer, for a period of two weeks, he assures me he had no trouble with the plate, but on returning to his home, which is situated in a high, mountainous part of New England, there was a recurrence of the old trouble. Hints regarding the treatment of this case are solicited through the columns of this journal.—E. W. C.

HOW TO MAKE A MODEL FROM A PLASTER IMPRESSION, WITHOUT THE USE OF VARNISH OR OIL.—Get a two- or three-ounce bottle filled with aniline red, perforate the cork, and insert a one-twelfth inch tube, to project about one-half inch,—a chicken-quill will do,—a cake of soap and a brush. These are implements that do away with varnish and oil. Put in your plaster-bowl the requisite quantity of water (and salt if necessary), and a few drops of the aniline dye to give the water a rather deep tint, drop in your plaster so as to absorb all the water without stirring (this prevents bubbles), fill your cup, and take your impression. This will be found to be nicely colored throughout, and will serve as a guide in separating impression from model while cutting the former. Now take the brush and soap, rub on a good lather, which you proceed to apply to the impression, after which wash the impression by pouring in water from a little height; the impression is now ready to fill with plaster for the model. We think this process possesses advantages over the other. First, it takes less time. Second, it is more accurate, as the film of varnish and oil must certainly be of some thickness.

Why I prefer soap in cake instead of solution is, that it is always at hand, in a certain condition; the solution will smell or thicken in course of time.—A. J. Rederich, D.D.S., *Sioux City, Iowa.*

To Revive an Etherized Patient.—If it is desired promptly to restore one who has been under the influence of ether, and prevent the long doze which so frequently follows etherization, compel the patient as soon as consciousness is sufficiently restored, to drink half a goblet of water.—E. J. Roberts, D.D.S.

Rubber *vs.* Celluloid.—My attention has been called to an article in one of our dental journals under the above caption, in which the writer says that himself and many of his co-laborers are disappointed in celluloid. He complains that he has misfits; that he has to grind the teeth after taking special pains to obtain a perfect articulation; that the color fades, and that many plates warp so as to be useless.

Experiments and experience have taught me some facts which may be of benefit to others as well as myself, and I offer them through the Dental Cosmos.

Misfits, after a good impression, are caused by warping.

If the warping has been considerable the plate is useless; the work must be done over from the beginning. If the warping has been but slight, it is only a "misfit." We find here *two* of the difficulties under one cause. If you will let your flask cool slowly (two or three hours), then remove all the plaster from the lingual surface of plate (soak the plaster in cold water, and it will cut out more easily), and leave it on the model and in the flask a few hours (twelve at least), then take it out and finish, you will find no trouble from warping. If you wish to avoid the necessity of "grinding," be sure to perfectly close the flask. If you do not you will have to "grind" just in proportion to the amount the flask varies from a perfect closure, no matter how perfect the articulation may be.

Cut a groove sufficient for all surplus material, and there will seldom be difficulty in closing the flask. Take plenty of time for heating and closing, but never raise the heat above 280° F. I am satisfied that too much heat renders the plate liable to fade. If there are any dentists who find any trouble in the use of celluloid, let them ask information through the Dental Cosmos or some other dental journal, and never use rubber under any circumstances while it is subject to license.—W. B. Steere, M.D., *Dodge Centre, Minn.*

Hints about finishing Rubber Plates.—After the teeth are adjusted to the base-plate, "wax up" very carefully, putting on very little more wax than you wish rubber when the plate is finished. With heated knife *carve* wax nicely about necks of teeth, and smooth the whole surface of plate with knife and flame of spirit-lamp. After flasking, take an even-edged knife (not sharp, as it would cut too much) and carefully go over the whole *male* part of the plaster, trimming off any little *hummocks* there may be, so that you have a nice surface, then finish up with fine sand-paper; pack your case and vulcanize, and, if *moderately* smart, *sixty minutes'* time is all you will wish to finish your upper set, with no use of scrapers and little filing.—A. H. C. Jewett, *Laconia, N. H.*

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to Act of Congress, in the year 1873, by J. Foster Flagg, D.D.S.,
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(Continued from page 455.)

In former years the operation of drilling a "tap-hole" was a labor of no little moment, frequently consuming an hour or more for its accomplishment, being excessively fatiguing to the operator, either with the bow-drill or hand-drill, and usually leaving the tooth (particularly molars) in so tender a condition from long-continued manipulation as to necessitate several days of rest before proceeding even with the operation of filling the canals, not to mention that of the "tap" itself.

Now, however, the work of this department of treating the teeth is so modified by the use of the dental engine, particularly when driven by power (either water or electricity), that the "tapping" of a tooth is but a trifle, either from the stand-point of exertion or time required, and neither is it productive of any noticeable irritation about the tooth.

This latter consideration is one of the greatest importance, for, so much of the normality of the organ having been taken away, it is most desirable that there should be the least possible increased deviation.

I have passed from cavities of decay affording access for thorough extirpation, to the tapping of teeth, in a somewhat summary manner, but I have done so *because* the attempt to extirpate pulps is yet so very frequently made through cavities of decay which are so situated as to render *thoroughness* a physical impossibility; and I desired to typify the promptness with which I abandon all such cavities as means of ingress, and regard them only as places to be filled.

During my practice I have re-treated nearly as many teeth as I have treated, and these re-treatments were rendered necessary *mainly* from futile attempts to extirpate the pulps of incisors, cuspids, and bicuspids through *medium-sized* cavities on their mesial or distal faces, and the pulps of molars, both superior and inferior (but particularly inferior), from cavities on their distal or disto-articulating faces.

It is very difficult to make a respectably good extirpation of the pulp from an incisor, a cuspid, or a bicuspid from a cavity fairly on the mesial or distal face of the tooth (particularly the distal, and again, particularly, bicuspids), and it is a usual *impossibility* to make as good an extirpation as is always desirable.

In molars, both superior and inferior, but particularly inferior, it is *impossible* to make a *thorough* pulp-extirpation from a cavity on the distal face of the tooth, or even from one which impinges somewhat notably on the disto-articulating face, and it requires much patience and great skill to make *even a respectably good* operation in such cases.

For these reasons, I repeat, I promptly abandon all such attempts, and direct effort primarily to the obtaining of such entrance as will permit of *thorough extirpation.*

This is accomplished either by enlarging the original cavity of decay or by drilling a "tap-hole," as has been stated.

In *superior central incisors* the shape of the pulp-cavity approximates that of the external form of the tooth, and is only markedly different from it in the exceeding thinness or sharpness of that portion nearest the cutting edge of the tooth; but this fact is a very important one to be remembered, for, as has been mentioned, the perfect maintenance of color in a tooth is due to perfect integrity of its pulp. When, therefore, the life of the pulp is destroyed a change of color must necessarily follow, but much of this unfortunate sequence may be avoided by completeness of removal of remains of pulp-structure.

This, in central incisors, is very readily effected (when proper ingress is afforded) from the root portions, in consequence of the large and cylindrical form of the canals, but it is not so easy to assure that exemption from darkening in the center of the labial face of the tooth (most important) which is so desirable.

This can alone be secured by a *complete obliteration of the natural boundaries* of the cutting edge of the pulp-cavity, for nothing less than this will positively assure the thorough entrance into so thin a space.

If the original cavity of decay in a superior central incisor is located upon the labial face of the tooth, and is sufficiently high to impinge upon the neck of the tooth, passes somewhat under the gum; or if it is a *very large* cavity, either upon the mesial or distal face, impinging, perhaps, on the palatal face ; or if it be fairly located upon the palatal face, a thorough pulp-extirpation can generally be performed.

But if the cavity be lower down upon the labial face, or be of but moderate size upon either mesial or distal face, it is then better to accord to that cavity of decay only such treatment as would be given to any ordinary cavity of deep-seated caries, and proceed with the filling.

Either before or after the performance of this operation the "tap-hole" should be made upon the *palatal* face of the tooth.

The drilling of a tap-hole is much facilitated if the polished surface of the enamel is first removed.

This is best done by using the edge of a small *inverted cone* drill, at slow speed, as too rapid rotation renders liable the checking of the enamel at greater distance from the center than will be covered by the diameter of the tap-hole, and also the needless fracture and wear of the points of the drill-teeth.

Having thus "spotted" the center, the entrance is made with a small spear-pointed drill.

The reason for effecting this first entrance with a small drill is that a *liability* to fracture the tooth is inseparable from the use of large spear-pointed drills, and the object gained by the spear-point is that it greatly facilitates the progress of the work by opening an avenue, which can be *enlarged* much more easily than can an orifice of equal size be *made* by the use of inverted cone or rose drills.

In *superior lateral incisors* it is *always* better that pulp-extirpation should be performed from the *palatal* face, for these teeth have, as a rule (though this is exceptional), a thin, flattened, and somewhat tortuous canal.

It, however, becomes a question for serious consideration whether a cavity located upon the mesial or distal face shall be enlarged, or a decided and separate tap-hole shall be made.

The small size of the lateral incisor is to be regarded as adverse to the propriety of increasing the number of orifices in its crown, as every one of these weakens an already frail tooth, and yet the difficulty of complete extirpation, other than by *direct* entrance into the canal, should be constantly remembered in its bearing upon discoloration and even future abscess.

In laterals of *very small size*, having cavities on mesial or distal face, it is better to open the cavity as far round upon the palatal face as is essential for perfect entrance into the canal.

This is preferable from the fact that the narrow portion of tooth-structure which could alone remain between a palatal tap-hole and the cavity of decay is very liable to fracture ; but when such greater size of lateral exists as would preclude this likelihood, it is then better, I think, that a tap should be drilled fairly upon the *palatal* face, and that orifice alone be regarded in connection with the further treatment of the tooth.

With *superior cuspids* the same general considerations will be found to exist as pertain to central incisors, with the exception (marked difference) that tap-holes are rarely admissible.

The crown portion of the pulp-cavity, which still maintains a reasonable similarity in shape to the exterior of the tooth, is easily cleansed, and the canal is large, round, and accessible, but the formation of the crown is such as to present no one face having more than another decided relations with the direct entrance into the canal.

It will therefore be found that, with very rare exceptions, the cavity of decay, wherever it may be located, will prove a reasonably good route for ingress to the canal.

In exceptional cases, when cavities of exposure are located directly mesially or distally, and are high up on the neck of the tooth, it would doubtless be good practice to tap, for extirpation, on the *palatal tuberosity.*

In *superior first bicuspids* we shall find that decided variation in the shape of the pulp-cavity from the shape of the tooth externally which warns us that a study of pulp-cavities should be made from the standpoint of their own individuality, and without the usual mental reference to the exterior of the teeth themselves.

I refrain from giving diagrams or lengthy and minute descriptions of the several pulp-cavities, from a belief that little good would be thus accomplished.

I shall continue to point out briefly, marked peculiarities, but those who are truly interested in this study will reap the greatest benefit from sawing teeth into sections and noting pulp-cavity points, each for himself.

This kind of investigation will show that the crown portion of the pulp-cavities of superior first bicuspids is formed with two cornuæ of very much more unequal length than are the cusps of the teeth, and that while the roots are *usually* though not invariably *bifurcated*, the canals are almost invariably bifurcated even in apparently single-rooted teeth of this class.

Many a superior first bicuspid has given trouble after treatment, from an ignorance of this fact; indeed, it is *the most frequent cause* for *re-treating* this tooth that has come under my notice.

The canals of the superior first bicuspid are most thoroughly entered from the articulating face of the tooth, though when the cavity of decay is on the mesial face a very fair entrance can usually be made without encroaching much, if any, upon the articulating face; but if the cavity be upon the distal face, and the first molar be in position, it will usually be found desirable to tap the articulating face, and then decide, from the quantity and quality of the tooth-tissue remaining between the tap-hole and cavity of decay, as to the expediency of removing it by chiseling, or of maintaining it intact.

The superior first bicuspid is normally a decidedly larger tooth than the second bicuspid, and the buccal root and buccal canal are almost invariably the larger root and canal.

The *superior second bicuspid* is usually a small-crowned, single-rooted, and single canal-tooth, but the root is more rounded and the canal larger and much more easy of access than are those of the first bicuspid.

For these reasons the second bicuspid offers greater facilities for thorough extirpation of the pulp and consequent increased chances for successful treatment.

When cases occur, as they sometimes will, in which a tap-hole seems indicated, it should be made on the *articulating* face.

The *superior first molar* (or sixth-year molar) is a fairly-formed and handsomely-developed tooth, with a pulp-cavity possessed of not unduly long or attenuated cornuæ, and with three well-defined root-canals corresponding with the three well-defined roots.

Of these the palatal is by far the largest; the mesio-buccal is next in size, and the disto-buccal the smallest.

These canals can usually all be entered from the *articulating* (best), *buccal* (next best), or mesial (fair) face of the tooth, but cannot be entered with any reasonable degree of thoroughness from the distal or palatal face.

If, therefore, the original cavity of decay is located upon either of the last two faces, I prefer *at once* to fill them and tap the tooth for extirpation.

If a cavity has already been pronounced, *and is filled*, upon either the articulating (1st) or buccal (2d) or mesial face of the tooth, *with the second bicuspid out*, I remove the filling and treat through that cavity, but if no such concomitant be present, I tap through the *mesial sulcus.*

The *superior second molar* (twelfth-year molar) is the most variably formed (normally) of any tooth in the mouth. It is usually a *flattened* molar, compressed in both its crown and its root formation, and so universal is this compression that it becomes questionable as to the rightful use of the term "normal" in connection with any other than a *somewhat flattened* tooth.

From this fact the operation of pulp-extirpation is attended with greater difficulty; *and its thorough performance is sometimes impossible.*

As with the first molar, the palatal root and canal are usually well defined, even with second molar compression, but the buccal roots and canals are usually much constricted at best, and sometimes have not a mesio-distal diameter much, if any, greater than that of a hair.

Sometimes one of the buccal canals seems developed at the expense of the other, and when this is found to be so the smaller canal is inappreciably fine.

Of course all efforts at following such openings and extirpating such filaments of pulp would be unavailing, but these flattened canals should always be sedulously sought for, if only to be entirely certain that nothing larger exists.

The superior second molar is only well entered from the *articulating*, *mesio-articulating*, or *bucco-articulating* faces.

The *superior third molar*—wisdom-tooth, *dens sapientiæ*—is a tooth much more amenable to pulp-devitalization and extirpation than is usually supposed.

I have quite a number of these teeth (a hundred at least) that have now been doing duty (pulpless) for periods varying from ten to twenty years, and, as the result of this experience, I have felt warranted in largely increasing the number during the past ten years.

The pulp-cavity of the third superior molar is usually large and quite easy of access considering the inaccessible position of the tooth, and the canals are usually more easily entered than are those of the second molar.

The pulp-cavity of the superior wisdom-tooth is more decidedly an enlargement, by confluence of the mouths of the several canals, than is the pulp-cavity of any other molar, and thus serves as a sort of funnel or director, which guides the pulp-hook and probe, and facilitates both extirpation and subsequent medication.

Though the canals of this tooth are thus defined and distinct, it is nevertheless usual that the roots should be confluent, forming one irregular truncated cone.

It is this peculiarity of formation which makes this tooth, as a rule, that one which is *easiest to extract.*

This confluence of roots is, however, by no means universal, for, on the contrary, they are sometimes so very multiple as to exceed in number those of any other teeth.

These teeth have frequently three, sometimes four, and occasionally five, *well-developed* roots and canals.

(To be continued.)

DEVITALIZED TEETH AND THEIR MANAGEMENT.

BY DR. F. H. REHWINKEL, CHILLICOTHE, OHIO.

(Read before the New York Odontological Society, May 22d, 1877.)

Part Second.

The loss of vitality of pulps of teeth through the encroachment of caries is an occurrence more frequently met with than might be expected, considering the advanced state of operative dentistry. It is true it is found chiefly among persons of limited information in regard to the proper means of preserving their teeth, added to a careless indifference as to their loss. When cases of this kind are presented to us, we are told that these teeth have been quite painful at different times, and find that the irritation, inflammation, and other accompanying disturbances having yielded to domestic remedies applied for pain, the pulp has gradually died, the tooth giving no "further trouble." In some instances an alveolar abscess may have been previously developed, which, having passed through its ordinary course, has left either a fistulous opening through the gum, or perhaps, to all appearance, has perfectly healed, showing no sign of any morbid condition in the surrounding tissues. Such cases present themselves under endless varieties of circumstances,—very many of them being well calculated to deceive the young and inexperienced practitioner. It is oftentimes impossible to get an intelligent history of the case from the patient, and the operator is compelled to rely entirely upon his own judgment. If this is sound, and matured by sufficient experience, he will most likely be saved from falling into an erroneous method of procedure. To fill any tooth, in which the pulp has become devitalized from accidental causes, without a thorough antiseptic treatment of the root-canals, would be exceedingly injudicious, as irritation of the root-membrane, inflammation thereof, and possibly alveolar abscess, would almost inevitably follow.

Notwithstanding all the care, judgment, and skill exercised by the best operators, it will often happen that pulps die under metallic fillings; not alone those which were actually exposed at the time of filling the tooth, but also such as were still protected by a thin layer of dentine. This fact we all know, to our frequent mortification and chagrin.

At times considerable irritation is produced through thermal changes, the metallic filling acting as conductor; this, fortunately, often subsides after a few days, and all seems well. Again the irritation gradually increases, until inflammation of the pulp ensues, which is more or less severe, and unless the filling is promptly removed, and a soothing and antiphlogistic treatment of the pulp instituted, it will end in the loss of its vitality, accompanied by febrile disturbances, much pain, and other acute phenomena peculiar to alveolar abscess. At other times the loss of vitality will be so slow and gradual that the tooth may scarcely present any of the symptoms of acute pulpitis. This condition is mostly found in those teeth in which the fillings are defective, leaky, or in which re-occurring caries has gradually reached the pulp, the filling still protecting the pulp from contact with solid foreign bodies. When such fillings are removed prior to refilling, and the decomposed dentine is being cut out, there will often be found a very suspicious absence of pain or sensibility in close proximity to the pulp-chamber.

The young and inexperienced operator would of course be cautious and guard against exposing the pulp, probably congratulating himself upon this apparently favorable condition of things, and perhaps proceed to refill the tooth. This would prove a grievous error. It is advisable, nay, absolutely indispensable, in all such cases to be thoroughly assured of either the life or death of the pulp; for it would be a less evil to expose a pulp, possessed of vitality, than to refill the tooth with the dead and decomposed pulp-tissue remaining in the roots. To determine this question, the usual tests, such as percussion, applying streams or jets of hot or cold water, or gentle probing with an explorer in the locality of the pulp-chamber, must be resorted to. If the cavity of decay is of sufficient depth to come in close proximity to the tooth-pulp, and if none of these tests produce any response of pain or sensibility, the life thereof is in serious doubt; investigation should now become more thorough, and the explorer or excavator must be used boldly to settle the question one way or another; there must be no uncertainty as to the life or death of the pulp.

If only partially devitalized, say within the pulp-chamber, and if the extremities of the roots still retain sufficient sensibility to cause pain when touched, the writer would advise the total devitalization of the remaining sensitive portions, or the complete removal of the same by instruments, if it can be done. Under scarcely any circumstances would it be admissible to refill such a tooth, with any part of the pulp remaining in this doubtful condition. A thorough antiseptic treatment ought to precede fillings of all kinds in such teeth.

Teeth which have been filled with oxychloride of zinc, either as a capping over exposed pulps or temporarily, in which the pulps have died, present some peculiarities which it may be well to note here.

Instead of the ordinary putrefactive action which is usually present in most cases, in these we have no discoloration of the tooth, no perceptible moisture in the pulp-chamber and root-canals, and no putrefaction of pulp-tissue,—the latter being dried up and mummified, literally embalmed by the chloride of zinc, the pulp-chamber containing no putrid matter.

This explains why teeth in this condition are so singularly free from fetid odor, and the dark and opaque hue so often found in those in which the pulps have undergone the process of putrefaction. It also explains why these teeth, even with the dead pulp-tissue remaining in chamber and canals, and left unfilled and to their own fate, so seldom cause trouble afterwards. Hence, perhaps, the many reports of success in saving the vitality of pulps with this agent.

When a tooth is to be "permanently" filled, in which the pulp has been capped or protected (?) with oxychloride of zinc, there is of course always a probability of re-exposing it, unless great care is exercised in excavating or scraping the part of the cavity in immediate proximity to the pulp; the examination, or rather investigation, of the state of vitality of this organ must of necessity be only superficial, the main point being not to disturb the layer of capping over the nerve. The reports of the great success of chloride of zinc, as a preserver of pulp-tissue, should be taken with a good deal of allowance.

Especially doubtful are those cases which were treated during the earlier period of the use of this agent, and in accordance with the *then* favorite method of application.

In refilling a tooth in which oxychloride of zinc has been used for the purpose of protecting the exposed pulp (in direct contact therewith, or even over the wave of carbolic acid), it is well to be satisfied first that there is vitality in this organ; the use of the tests already mentioned will place this beyond a doubt.

Fortunately, mistakes in diagnosing these cases are not as fatal as they would be in those before described. If the pulp is found to be dead, even these teeth ought to be subjected to some preparatory treatment before receiving another filling. Although the danger to the root-membrane through the septic action of dead organic matter is less in these than in other cases, still there is just enough possibility of evil resulting to necessitate caution and care.

The antiseptic and embalming properties of chloride of zinc have already partly prepared the way for expeditious and successful treatment. The first thing to be done is to open the pulp-chamber thoroughly, and to expose the mouths of the root-canals, removing everything of the remaining dead, dry pulp-tissue; then a thorough washing of the chamber and root-canals with alcohol,—spirits of cologne. If there should be any portions remaining with some vitality in them, destroy this, or remove the whole with instruments. This latter condition would demand a similar antiseptic treatment to that given in detail in the first part of this paper. If the loss of vitality is complete, and the removal of the *débris* has been successful, the roots may be filled with cotton or silk, charged with either creasote, carbolic or salicylic acid (in ether solution), and tested for a week or more under a moisture-tight filling; if on reopening the cavity the cotton or silk contained within the root-canals is free from discoloration,—*perfectly clean*, with no odor of putrid matter,—and if the tooth itself has given no signs of uneasiness, and is not sore on percussion, it is as ready for filling as it probably will be at any subsequent time.

There remains yet to be considered that class of teeth in which the pulp has died from the gradual wearing down of dentine to a too close proximity to the pulp-chamber, as is often found in persons of advanced age. Likewise those teeth in which the pulp has lost its life through partial calcification and obliteration of root-vessels. Under this head may also be classed those in which the vitality of the pulp has been destroyed by violence,—hard blows upon the teeth, partial luxation, too rapid wedging or moving, for the purpose of regulating. In any of these cases we will have to all external appearance a perfectly sound tooth-structure, and the diagnosis is frequently somewhat difficult to the young practitioner.

In nearly all of these last-mentioned cases there will be pulpitis, more or less acute, before the death of the pulp occurs. This is often submitted to by the patient without seeking relief; and not until putrefactive action has commenced, and incipient alveolar abscess appears, is the case submitted to the dentist.

When thus presented, nothing can be gained and no relief afforded without opening into the pulp-chamber. If any of the front teeth are so affected, the opening should be made through the lingual surface of the crown; if in bicuspids or molars, through the center of grinding surface; always large enough to gain free access to the root-canals.

When a case is presented in the early stages, while yet confined to simple inflammation, it may be desirable to make an effort to subdue the inflammatory action and restore the pulp to health by soothing applications. If septic action has gone so far as to preclude the possibility of preserving its vitality, kill promptly and boldly, and treat the case as recommended elsewhere.

The above classification is deemed sufficient for the practical purpose of indicating proper treatment. Let it be borne in mind that through the loss of the vitality of the tooth-pulp the main supply of nourishment is cut off, and that the only dependence the tooth now has is through the root-membrane upon the cementum,—the only part of the tooth endowed with vitality. At the same time, the periodonteum is also called upon to nourish the bony walls of the alveolus, and is its periosteum. Upon this membrane and its vitality and healthy condition depend the future fate of a devitalized tooth. It follows, therefore, that the means and methods used in preparing such teeth for future usefulness should be well understood, and great care and attention bestowed upon this whole subject.

Considering the many *general* causes of irritation to which the root-membrane is subject, exclusive of local causes, and over which neither patient nor operator have any control, such as syphilitic, scrofulous, or mercurial diathesis of constitution, it is and should be a source of gratification and pride that operative dentistry can and does accomplish so much in this direction.

By way of illustration, let us now suppose that the second inferior molar or bicuspid has a cavity of decay on the posterior proximate surface. We find the pulp dead; the tooth is free from soreness, with *no* fistulous opening through the gum, and presenting no visible indication of active morbid disturbances. What shall be done in such a case? Is it safe to fill such a tooth without preparatory antiseptic treatment?

If these papers were written for the benefit of members of the New York Odontological Society, such questions would be superfluous; the writer addresses young and inexperienced practitioners, and to them the question seems *apropos.*

Therefore let us consider the matter: were we to fill a tooth in the condition described, with the dead pulp-tissue remaining in the pulp-chamber and root-canals, with septic action already established, it would be as wise as to hermetically seal a bottle containing yeast and put it in a warm place, and expect no consequences to follow.

In this case we have the simplest phase of a devitalized tooth, and we proceed now to adjust the rubber dam to facilitate further operations. The proximate cavity is to be converted into a compound one by drilling through the center of the crown into the pulp-chamber, then cutting out the remaining bridge of dentine between the original cavities, enlarging this with suitable fissure-drills, and far enough forward to expose the mouth of the anterior root-canal. The chips of the bur are expelled with the air-blower, or, if too moist, washed out with a syringe, the cavity and rubber dried, and the root-canals opened and examined. The dead and decomposed pulp-tissue must be removed therefrom; if sloughing has gone on for an indefinite length of time there will be but little tissue to take hold of, and we must then rely upon therapeutical agents to disinfect the canals, followed by antiseptics. For the purpose of disinfection, chloride of soda, Labarraque's solution of chlorinated soda, one or two applications, made in the manner already described. This is to be followed with creasote, carbolic acid, salicylic acid, in ether solution, to be changed or renewed every other or third day. This is continued until the cotton or silk in the root-canals is free from all discoloration and perfectly white and clean, and strongly impregnated with the odor of the agent which has been used. The first applications should be made rather loosely, and the stopping in the main cavity should not be air-tight. As the treatment proceeds the applications are made more compactly, and finally the outer cavity is hermetically sealed with either a compound of beeswax and mastic or gutta-percha, as a test. When all has progressed satisfactorily, and the test-filling has developed no irritation of the root-membrane, the tooth is ready to receive root- and crown-filling.

The question as to the best material for filling roots has already received consideration in the first part of this paper, and it is only necessary to add that the condition of the root-canals should alone guide to a choice of materials,—repeating again that much more depends upon a correct appreciation of favorable or unfavorable conditions of the root-canals, constitutional peculiarities, temperament, locality, and the general state of health of the patient, than upon the particular material with which the root-canals are filled. The particular tooth cited as illustrating the condition under consideration being a lower molar, probably with contracted roots, presenting a barrier to free access to the apex of the roots, the writer would advise either oxychloride of zinc, gutta-percha solution, or the shellac solution of Dr. H. S. Chase of St. Louis. Each one of these has its advantages. The first has distinct therapeutic properties, and the two latter can be more easily introduced into the root-canals.

If the process of disinfecting the roots has been attended with difficulty, owing to contracted or tortuous canals, giving rise to a doubt of having been able to force the medicinal agents to the very extremity of the roots, and of having been unavoidably obliged possibly to leave some dead organic matter in the extremity of the roots, oxychloride of zinc would, in the writer's estimation, deserve the preference.

If, on the other hand, no doubt exists of the thorough disinfection of the canals, and there is no ground for fearing some lingering trace of septic action, either one of the latter would answer as well, perhaps better, because more readily pumped down or up into the extremities of the roots.*

Many writers and eminent practitioners would deem such a prolonged treatment unnecessary, and proceed with more expedition. Admitting that in favorable localities and with other propitious circumstances this may be admissible, the young practitioner is cautioned and strongly advised, however, before venturing upon any material modification of the plan as herein suggested, to study well the question of locality and individual idiosyncrasies, which study the able and admirably-written papers of Dr. J. Foster Flagg on "Dental Pathology and Therapeutics" will greatly facilitate, especially that part relating to temperament, found in vol. xviii. Nos. 1, 2, 3, 4, 5 (January, February, March, April, May), of DENTAL COSMOS, 1876.

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* See "A New Way of Filling Roots," by H. S. Chase, M.D., D.D.S., of St. Louis. *Missouri Dental Journal*, vol. ix. No. 4 (April, 1877).

Only a fair knowledge of climate, peculiarities of localities, temperament, occupation, and constitutional idiosyncrasies, will enable a conscientious practitioner intelligently to modify a general treatment in given cases.

The treatment suggested has proved safe and remarkably successful in unfavorable localities, with persons of doubtful constitutions, and with all varieties of temperaments. If the writer errs, he prefers to do so on the safe side.

It may be well to add, that in making the applications the fluids of the mouth should be prevented from entering the cavity. Everything should be in readiness; the broaches mounted with cotton and charged with the fluid, and other instruments to be used within reach, and everything in ready order. It is well that the young practitioner should learn how to keep the cavity dry for a few minutes without the rubber dam, and with the simple appliances upon which the older members had alone to rely, even for filling, viz., napkins and duct-compressor.

As soon as these are properly introduced, the old dressing is removed from the tooth, the cotton is withdrawn from the canals by a partially worn-out barbed broach, and the new dressing replaced, and the main cavity stopped with cotton, wax, or gutta-percha.

This for simple cases, and for those more complicated the treatment does not much vary; the main principle advocated in the foregoing holds good for all.

Chronic alveolar abscess, or gum fistula, is one of the complications most frequently met with. Even in such cases the antiseptic treatment remains the same; but the question as to the proper time for filling the roots is by no means definitely settled. Some first-class operators contend that a pulpless tooth with an outlet or fistula through the gum may be filled as soon as the root-canals are thoroughly cleaned, and with but little antiseptic treatment, claiming that the fistulous opening heals speedily, without any special effort, as soon as the canals of the roots are filled. Sometimes they do; but the opposite is more frequently the case. It depends entirely upon the recuperative powers of the individual, and upon his constitution and temperament, and whether the system will consent to, and acquiesce in, such "infractions upon normality," or whether it will resist them.

It is not the purpose of this paper to criticise or to find fault with their modes of operating; the writer simply wishes to say that such summary proceedings would prove fatal in his locality. In these cases he is *doubly* careful, endeavoring, above all things, to open the root-canals thoroughly, even *through* the foramen of the root if possible. Then, with dressings of creasote, thymol, or carvacrol (no great difference in them), through the root-canals, an effort is made to reach the "sac" at the point of the root. When, owing to the contracted shape of the canal, this is unsuccessful, the same agent, diluted, is introduced through the fistula, which should be enlarged and kept open by tents of cotton or silk. When there is no destruction or perforation of the bony structure of the alveolar border, it is oftentimes advisable to perforate the border with a trephine at a point in a line with the apex of the root. In single-rooted teeth the writer has succeeded in cutting off the point of root, and separating the "sac" entirely, thus at once removing the whole difficulty.

Unfortunately, this can be done only in comparatively few cases; the main reliance, therefore, must be upon antiseptic agents introduced through the roots, or by the method of Dr. Farrar.*

The mode of treatment of Dr. Farrar is just what is claimed for it,—"radical,"—and, if faithfully carried out, is in all respects effective and satisfactory. There are but few cases in which the writer would feel justified in filling the roots of teeth until satisfactory progress has been made in healing the fistulous opening. Much can be accomplished by patience and perseverance.

Within the last two or three years the method of extracting and replanting teeth has been revived, and is frequently resorted to in cases which will not readily yield to treatment, and, from the many and flattering reports of success, promises to become popular. The writer's experience in this is too limited as yet to justify the expression of decided opinions; he is encouraged to hope that, with good judgment exercised in selecting the cases, much time will be saved to both patient and operator.

The treatment of teeth with lifeless pulps, under gold or other metallic fillings, is precisely the same in all respects; but, instead of removing a good proximate filling, it should be left undisturbed, and access to the pulp-chamber gained in a way already indicated.

A few words in regard to treatment of and root-fillings in deciduous teeth may find a proper place here. As a rule, metallic root-fillings for temporary teeth cannot be deemed advisable. If the pulp in such teeth has been devitalized, either designedly or by accident, the same treatment as for permanent teeth, as far as it is possible to adapt it, is recommended; then, under favorable circumstances, if the disinfection has been thorough, the roots should be filled with gutta-percha. If the age and disposition of the child render such treatment impossible, the operation of Hullihen (not originally intended for this purpose) is especially applicable. The pulp-chamber is drilled into, at a line or so above or below the margin of the gum, on the buccal surface of the tooth; the size of the drill about the same as No. 100 of S. S. White's engine drills; a piece of gold, silver, or steel wire of the same thickness is now inserted; this is capped with a flat piece of gutta-percha, made just pliable enough by heat to adapt itself to the bottom of the cavity, and the rest filled with tin or amalgam. The wire is now withdrawn, and the "safety valve" established.

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* See "Radical Treatment of Alveolar Abscess." By J. N. Farrar, M.D., D.D.S., Brooklyn. DENTAL COSMOS, vol. xviii. page 582, November, 1876.

It was the purpose of the writer to enlarge upon some of the difficulties which present themselves in the management of devitalized teeth, produced by peculiarities of constitutional diathesis, localities, and other accompanying and uncontrollable circumstances, but the paper having already attained considerable length, if further attempts were made in this direction it would assume formidable proportions. It is hoped that enough has been said to indicate the main principles of treatment upon which success depends. The endeavor has been to show that certain things are indispensable, and that circumstances decide how far these measures of safety may be modified or omitted. The most skillful manipulator, unless he is Zahnarzt (dental physician) in the true meaning of the word, will make but little progress in the treatment of such cases as we have had under consideration.

Every intelligent practitioner will readily comprehend that everything which may possibly influence the final result of such operations, be it climate, constitution, temperament, or anything else, which even in a remote degree may become a factor of irritation to the surrounding parts of a pulpless tooth, must be made the subject of study and consideration.

ROTATING TEETH IN THEIR SOCKETS IN THE PROCESS OF THEIR REGULATION.

BY J. N. FARRAR, M.D., D.D.S., BROOKLYN, N. Y.

This is one of those little annoyances of the dentist which, according to the old method of operation by the use of ligatures, has led to many disturbances of a psychological nature, which, if they did not take outward form by verbal expression, have often only been suppressed from fear of further undesirable consequences,—a condition of mind not in harmony with the laws of digestion or happiness.

Finding great satisfaction, peace of mind, and saving of time, during the past two years, from the use of a few simple devices which may be made to act as powerful wrenches *firmly* affixed to the teeth to be moved, and having calls from dentists for them, it has occurred to me that I would do no more than justice to my co-laborers to illustrate my favorite plans in the DENTAL COSMOS, in order that any person may be enabled to make and use them, if desired. *The main points necessary in the successful regulation of teeth are, firmness of application of the instruments and minuteness of the apparatus, in order to facilitate management and secure the ease and comfort of the patient.* Clumsiness of apparatus is a great stumbling-block to the success of operations as well as the reputation of dentists. The idea of a wrench application is not new, though original with me. Dr. Atkinson has used something of this sort, made after the shape of an old-fashioned, long-handle dipper, fitted over the tooth, with the handle used as the lever; but this device lacked firmness of attachment,—a defect that is fully overcome by my plan.

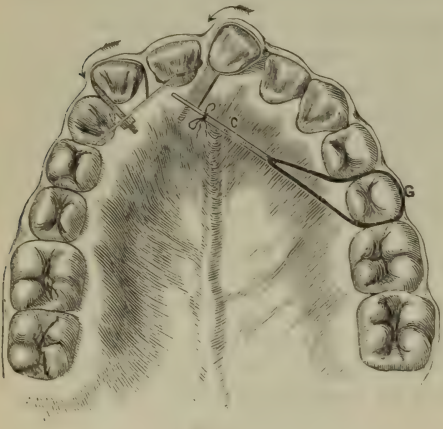

FIG. 1.

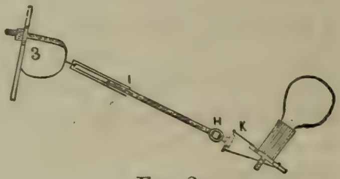

FIG. 2.

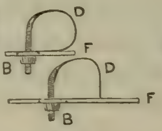

FIG. 3.

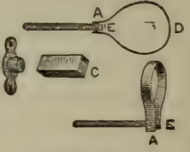

FIG. 4.

Figures 1, 2, 3, 4 represent some of the forms of these devices, and the ordinary methods of their application to the teeth.

Owing to the presence of the tongue, the box-wrench (Fig. 4) is not so applicable to cases in the lower jaw as the form represented by Fig. 3, but for the upper teeth the box-wrench is admirably adapted, and has a powerful leverage.

The apparatus should be made of eighteen-carat gold, unless it be the screw, which is often more durable if made of brass; but if a rivet-joint be made at *A* in Fig. 4, the screw may be made of steel.

If no joint is made, as is often my custom, soldering the thin gold band to the square head *E* of the screw,—steel will not answer.

The thin band *D* (Fig. 4) having been placed over and around the tooth to be rotated, it is made to hug firmly to it by being drawn into the square sleeve or box *C* of the box-wrench by means of the nut *B;* but in case the band-wrench (Fig. 3) is used, the same hug is made by drawing the screw through the bar *F* by tightening the nut *B.* The box-wrench (Fig. 4) is made to rotate the tooth by the attachment of its extremity to a band of rubber, *G*, and ligature, *O*, secured to some distant tooth, as shown in Fig. 1. The same motion may, however, sometimes be better made by a screw (Fig. 2) rotating in a swivel, *K*, attached to the wrench and secured to some distant tooth, the screw being made to turn by means of a lever through the eye *H*, which shortens the screw by its entering the barrel *I.* These devices are suitable for all sizes of teeth, and may be used for years with care. Devices made upon the principle of Fig. 3 are generally made to act by one end of the bar *F* resting firmly against an adjacent tooth, while the tightening of the nut, once or twice per day, causes the tooth to rotate. Though generally only one end of the bar *F* should project from the band, sometimes a double end can be made more useful.

This instrument (Fig. 3) is invaluable for securing teeth in proper position after completing the regulating process, as it can be used, without annoyance to the patient, for any length of time.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.—SEVENTEENTH ANNUAL SESSION.

First Day—*Morning Session.*

The seventeenth annual session of the American Dental Association convened at the Grand Pacific Hotel, Chicago, on Tuesday, August 7th, 1877.

The meeting was called to order at the appointed hour by the president, Dr. George W. Keely, of Oxford, Ohio.

Dr. Morgan opened the exercises by prayer, after which Dr. Dean, chairman of the local committee of arrangements, read a brief report, stating that the use of the assembly-room in which the meeting convened (the ladies' ordinary of the hotel) had been generously donated by the proprietor, and the rates of this and other hotels reduced. The omission of clinics from the programme was noticed, and the report said that it had become evident that this feature of the association had been lessening in interest from year to year, and the opinion had been growing more general that this method of teaching should be left to local societies, although for some years after the formation of this body clinics were essential.

The resolution of last year, inviting foreign dentists and medical men whose names might be approved by the executive committee, to seats upon the floor, was carried, and, at a subsequent period, the name of H. H. Winn, D.D.S., Shanghai, China, was reported.

The publication committee read its report, to the effect that five hundred copies of the Transactions of 1876 had been published, at a cost of three hundred and eighty-eight dollars. [These Transactions, as well as those of previous years, may be obtained on application to the secretary, Dr. M. S. Dean, 174 State Street, Chicago, at ninety cents each, postage paid.]

The special committee appointed last year to consider the advisability of dividing the association into permanent sections, made a report, which was read by Dr. Atkinson. This report closed with some resolutions recommending that the association be so divided, which, with the report, were made the special order for Thursday at ten o'clock, at which time a debate took place, which will be noticed in its proper place.

The reports of the regular standing committees were then taken up, and that of the Committee on Physiology was read by Dr. Dean.

The report was mainly a discussion of a few disputed points in physiology. The following brief statements were submitted without argument, as a groundwork:

(1) That the dentine is formed either by direct calcification of the odontoblasts, or is a product of a secretion of those cells. (2) After the dentine has been developed, these cells, with one of their processes extending into and filling the dentinal tubes, are arranged in contact with each other upon the internal surface of the dentine, and form what was supposed until recently to be the membrana eboris. (3) The odontoblasts having accomplished this work of development, their legitimate office thereafter is to perfect it, and to preside over its nutrition. (4) The dentine having no active function to perform, the work of these cells is now comparatively light, and their size and power are correspondingly diminished. (5) By the stimulus of irritation these odontoblasts renew their activity, and again commence the labor of building up the structure, though not always in exact accordance with the original type. (6) From the lessening of the tubes after the development of the dentine, and their obliteration in advanced age, it appears that there is a natural tendency to increased development during the life of the pulp, which is often hastened by irritation from an external source.

The point for discussion is: does vital action in any case resist the progress of caries? Are the changes observed in the living dentine attacked by decay due to vital manifestations of the dental cells? This view seemed to the writer to be manifestly true, but some authors oppose it, among whom are Leber and Rottenstein, C. S. Tomes, and Prof. Wedl. The former are inclined to believe the deposits due to a chemical process; a precipitate deposited in the canals. If this is true, the deposit is crude phosphate of lime, and they are the result then of vital action.

In regard to the theory that the phenomena of what Leber and Rottenstein term stationary caries is due to friction, pressure, and precipitation of lime salts, the writer said that if true it would seem that the solution would be so quickly removed as to negative the theory. The surface of the dentine may be polished by friction, but the writer was not aware that it might be condensed by pressure.

Mr. C. S. Tomes says that as no characteristic appearances can be found to distinguish caries in dead from that in living teeth, the theory of vital action must be abandoned in toto. This opinion is founded upon the *appearance* of the zones of transparency in the living as compared with dead teeth. His observations (he says) have been few, and it would seem that he had not, in coming to this conclusion, exercised his usual care in analyzing the evidence. How can these authors know, if they judge from the *appearance* of the tissues, without chemical analysis, that these zones are structurally the same in living and dead teeth? We may fairly conclude that although the appearance of the transparent zones in living and dead teeth may be similar, yet there is no evidence that they are chemically and structurally alike, nor that chemical action may not cause the one and vital action the other.

The report then offered arguments to show that changes do occur within the dentine, from the irritation produced by caries and other causes, which are due to vital action. The first argument in favor of the view that the dentinal fibrils become calcified is its *prima facie* probability. Mr. C. S. Tomes says, "Calcification does go on in the tubes long after the apparent completion of the dentine, and as irritation unquestionably causes this action to start afresh in the pulp, it would be natural to suppose that it would have the same effect in dentinal tubes." The fact that secondary deposits are formed upon the internal surface of the dentine when there is no apparent calcification of the contiguous fibrils, only proves that the irritation to which these fibrils have been subjected must have been sufficient to overcome the vital forces and cause their destruction. But when they have been less overpowering and long-continued, both calcification of the fibrils and a deposit upon the internal surface of the dentine are found.

The writer then referred to a single fact which shows conclusively that irritation of the terminal fibers of dentine does cause their calcification. It was the fact, which is generally established, that teeth filed or cut away for the purpose of making spaces and removing superficial decay become more dense upon the surface, the tubes becoming obliterated, and beyond a question this change is due to vital action.

The subject was then declared open for discussion.

Dr. Atkinson. This paper will entrap us into the belief that chemical action is not vital action. There is a difference, but there is no difference in the producing power. It is a great stumbling-block to make the distinction that is made. We think we have said something very smart when we have said that dentine and enamel are different tissues operated by different powers or energies. They both owe their production to consolidation of lime-salts. Reference to the learned gentlemen of Europe is very well, if we could only follow them with our eyes open, and digest what they say.

All bodies that we are acquainted with originate in embryonal corpuscles,—a protenaceous and homogeneous mass only understood as being an admixture of the various elements of affinity. When we come to know more about these modes and methods we shall stumble less.

In the paper, caries is considered as some sort of an agency operating in a certain way. It is simply the absence of togetherness in the tooth. We fail to get at and grasp the principles that are involved. If we did, the matter would be as clear as mathematics. If there are stronger affinities for the elements of the tooth than these elements have for each other, the tooth will decay. If we had a month to discuss the question, we would begin to comprehend something about it, and would know why it is that when we cut out a decayed place and fill it with some indestructible substance we succeed in saving the tooth. The secondary dentine is often harder than the enamel.

Dr. Chase, of St. Louis. The zones of calcified material are dense, and the more dense the dentine is, the easier the edges break away in preparing the specimens. The higher calcified the specimens are, the more friable and ragged are the edges. In a young tooth the specimens have perfect edges. Often there is a hyaline appearance in the vicinity of the cavity, and then there are invariably ragged edges and highly calcified structure. The only way to test the specimen, when in this condition, is by the way it rubs down. The author of the paper is correct; vital action does have a great influence in obstructing decay. As to Tomes's idea that vital action does not effect changes in once-formed dentine, he (the speaker) has specimens showing changes occurring in the dentine where absorption was taking place; he has seen specimens where the cellular tissue was mixed up with the dentinal tubes.

Dr. Waters (Boston) said he had made a large number of sections, and confirmed the statement as to the friability of the hard structure, and also of the density of the parts subjected to friction. One was from his own mouth, and he was well aware of the amount of labor that had been thrown upon it. One of the specimens had a discolored spot upon it, with a softened surface, through which he had made sections. The section through the crown and buccal root showed stratification, but the section through the discolored spot, when put under a 25th, showed places dissolved away between the dentine and enamel, and also in the enamel, which was very friable. In one section there was something that appeared like a vegetable mold or fungus, with thread-like rays leading off from it. In the enamel were found a large number of bodies of singular appearance resembling fungus, and somewhat resembling bone-cells. He suspected them of being of vegetable origin.

Dr. Taft moved that the privileges of the floor be extended to Dr. Abram Robertson, an aged and respected member of the profession, from whose eyes the light of day had been shut out for some eight years. Carried unanimously.

Dr. Robertson thanked the society, and took occasion to remark that he thought the newly-deposited dentine would resist decay, and instanced two or three cases where such dentine had proved itself capable of resisting destructive influences, and in one of which he thought there was a new deposit of dentine at the bottom of the cavity which pushed the filling out, the cavity being clean and polished under it.

Dr. Barker commended the paper, though he differed with some of its conclusions. He indorsed Dr. Atkinson, who calls attention to the fact that we must not separate chemical and vital action, as they are one and the same. There should be a caution exercised in using glasses of the power of a twenty-fifth. He would not, however, say that the observations were not correct.

Dr. Judd, of St. Louis. The points of the paper are well taken and well defended. It was stated that the dentine was formed by a secretion of the odontoblasts, or calcareous matter formed within the odontoblasts. He (the speaker) thought from all the evidence, that it is formed by a deposit of calcareous matter formed within the cells. The word deposition should be qualified. It is to a certain extent brought about by vital force. There is no evidence that the cells secrete at all. Dr. Atkinson says there is no difference except one of degree between chemical and vital action. Will he define that difference,—define when it becomes chemical and when it is vital? There is some other difference. He does not advocate a variety of forces, but is confident that there are differences other than in degree. The difference may be produced by the different objects on which the force is expended. The action of reagents on living or dead matter is different under different circumstances. He had heard gentlemen attempt to prove that corrosive sublimate was harmless because it had been demonstrated that it preserved dead tissues. If there is no difference except in degree, we might come to that absurd conclusion. He is unable to describe the difference, but it exists.

Dr. Atkinson said that Dr. Waters was probably correct, but he would like to have been present to examine whether the fungous growth had not got into the cavities by carelessness. It was only to be seen by a high power. Only vegetable substances assumed that form so far as we know. The highest authority claimed to have discovered it not long since, but he had seen it before. There is power wherever there is motion. He cannot weigh it, neither can he weigh a right-angled triangle, but there is such a thing. There is no such thing as dead matter; there may be a dead horse, but not dead matter.

Dr. Judd. There may be only one force, and there may be more. The difference may be in manifestations, and the substances through which the manifestations are made. Cohesive force is not called vitality, though it may be the same force as vital action.

Dr. Barker objected to the use of the terms vital and dead. He does not call an organic substance dead; it differs simply in vitality.

Dr. Waters said that he had submitted the specimens he spoke of to scientific men, and some of them thought they were animal, and others that they were vegetable. The lowest class of vegetable formations give out carbonic acid in great abundance, and he supposed the specimens belonged to that class.

Dr. Spaulding (St. Louis) commended the report. It has been said that vital action has a great deal to do with these processes; he goes further,—it controls them altogether. Chemical force is the same in the stomach that it is in the alembic of the chemist, but in the stomach the vital is the superior or dominating force; the chemical force acts only in obedience to the vital. There is no motion without a force. Life is matter in motion; and it is all dominated by a superior vital force which comes from above. One force builds up and one unbuilds. Both forces are eternal and persistent.

Dr. McQuillen said that twenty years ago he devoted considerable time to microscopical observations, and placed the results on record. He regarded the consolidation or deposit in the tubuli as the result of vital action. In diseases such as rickets, etc., the bones sometimes became softer and sometimes harder; and we might as well say that these conditions are not the result of vital action. We use language as it is found, and it is not well to split hairs. Is there a deposit within or a secretion from the cells? The odontoblasts are tissue-builders; they are arranged around the outer portion of the pulp, and in them the change takes place. The dentinal fibrils undergo change. He has never used a twenty-fifth, but most invaluable truths have been discovered by the use of high powers. Richardson has demonstrated that there is a difference between the blood-corpuscles of animals, which is important in a medico-legal aspect.

Dr. Barker thought the appearance might be due to a defect in the preparation of the slide.

Adjourned.

Afternoon Session.

The subject of Dental Pathology and Surgery was still under consideration, and a volunteer paper was read by Dr. L. C. Ingersoll, of Keokuk, Iowa, entitled "Is the Dental Pulp Essential to the Integrity of the Tooth-Structure?" The following is a synopsis of this paper:

The paper stated that the answer involved the whole question of pulp-treatment. Early practice was a devitalization. For half a century attempts have been made to cover the exposure, by both mechanical and medicinal means, with varying results. The effort to preserve has employed the inventive genius and studious research of the best minds. It has been pronounced a *crime* to extirpate the pulp.

A restoration to health of a diseased pulp is among the highest acts of professional skill; it involves a knowledge of the pulp-structure and functions, and the conditions of its life.

Oxychloride of zinc appears to have been considered superior to all other materials, and the profession seem satisfied with the success of the treatment. From the reports there is great uniformity in results, more so than in the case of most specifics. If these reports may be relied on, it must be a flagrant practice to extirpate a pulp. But to the writer they do not appear reliable. Is the exposure always the same in degree? Is the condition of it always the same? But it is treated all the same. Is it certain that the pulp will live and form its covering under the cap? How long after exposure may it be thus treated with success, and in what does success consist? Is it merely a comfortable condition of the tooth? Is there not often deception in the tests applied? It is absurd to trust to random reports. There are at least two unknown quantities in every case,—vitality and idiosyncrasies, —and in consequence practice must be empirical, and must vary in its results. Theories are often unreliable in practice, and "cases" are notoriously unreliable. There are "epidemics of opinion as well as of disease."

The paper then cited several examples of supposed remarkable success in various medical specialties, which, though they flourished for a time, soon signally collapsed.

The effort to save the pulp is commendable. The tests in some cases have been sufficient to warrant a belief that the pulp is preserved; but we are too confident that we have succeeded in most cases. The writer believes that the majority of cases are failures in from one and a half to three years. Cases may be reported as successful for that length of time, and then result in abscess.

Many cases called exposure are only cases of slight irritation, without inflammation. Another class involves simple inflammation, readily relieved. Still another class involves exposure caused by violence in mastication, or in preparing the cavity. These may all be treated with permanent success by careful handling and capping. If only such were presented, we might rely upon that treatment; but where the exposure is of long standing, and is undergoing elementary decomposition, the oxychloride only helps it to die easily, and embalms it after death.

The paper then proceeded to ask whether the tooth-pulp is essential to the integrity of the tooth-structure, and to its continuance in the mouth in a state of usefulness, and to these questions the writer answered, no. The soft tissues must have vitality to protect them from decay; but the teeth will last hundreds of years after the soft tissues are decomposed. Enamel, the most durable animal structure, has little vitality. Children's teeth are more vital, yet they decay more rapidly, than adults'. The pulp is chiefly a formative organ, and in that function it exterminates itself; in advanced life only a shriveled skin remains. Having completed its formative work, the indications are that it has nothing more to do. The question to settle is, when do its legitimate functions terminate? The teeth probably become mature in ten years after eruption, though this period may vary. Then the pulp takes its rest.

If the office-work of the pulp has been rightly set forth, the importance of the organ has been overestimated, and the case is complicated by long-continued efforts to save. The high standard of some requires an effort to preserve in all cases, even to the remaining fragments in the canals. Extirpation must be a *dernier ressort.* Viewed from the writer's stand-point, extirpation comes earlier upon the scene. The question is not the preservation of the pulp, but of the tooth. Aside from the cases mentioned, where treatment is easy, success is too doubtful to justify us in risking much, when so little is risked by extirpation. The success of this operation consists in its thoroughness. It requires great patience and skill in manipulating. Cases of extreme longevity of pulpless teeth are so numerous that they may be recalled by all. Henceforth let the salvation of the *tooth*, and not of the *pulp*, be the watchword.

The subject was announced open for discussion.

Dr. Rawls, of Kentucky, thought the doctrines of the paper peculiar, and could not allow them to pass without controversy. He objects to the doctrine that we should care more to save the tooth than the pulp. The presence of the pulp is necessary to preserve the entirety of the tooth. The tooth so preserved is better than a part, and will last better. When we can save the pulp alive it is better to do so for several reasons. First, we cannot always be successful in removing the pulp, and then we shall merely cap the end of the pulp. It is the same thing as any other capping except as to the locality. It is better to attempt to save the pulp, and then if we fail we can fall back on devitalization. The paper says the pulp was only intended to last till consolidation takes place; but when calcification is complete the teeth are of little account, and nearly worn out. We might as well say that when the muscles are formed the vessels should be cut and the tissues left to support themselves. He thought the paper would be likely to mislead younger members of the profession. The dentine is intended to be supported by the pulp, and when it is removed the tooth will disintegrate. If the root could always be perfectly filled, or even if the contents could be tanned, it would do well enough; but neither is possible in all cases.

Dr. Barker, of Philadelphia, is surprised at the position of the paper. It is true that some may have claimed too much success for pulp-capping; in Philadelphia they are unsuccessful, a fact which is due to thermal or atmospheric conditions. But he thought the effort should always be made. If the pulp had been intended to remain only ten years, it would have been removed by nature. The pulp is useful through life. His own teeth had become softened after a fever, but had again hardened, which he considered was effected through the pulp. It is our duty to save pulps as long as possible. If one of two associated organs is removed, the other necessarily performs vicarious action; if the pulp is removed, the peridonteum takes on hyperæmia and goes on to abscess. The author of the paper has not studied the action of such medicines as carbolic acid, etc. Carbolic acid forms a protective pellicle, and acts as an anodyne also. Too much irritation causes death and destruction of the pulp.

Dr. Sturgiss, of Illinois. The paper has been misconstrued. It is a practical paper in Keokuk, and it would be in Philadelphia if they knew there how to do what it advocates, which they don't! (Laughter.) That any one can save all teeth will not be claimed. He has treated a great number of cases in the same manner, under the same circumstances, so far as he knew, and the latitude and longitude were precisely the same, and he has had very varied success. In some he succeeds, and in some he does not. He is free to say that he has a pair of forceps in his office, and that he is obliged to use them sometimes. He had the worst opinion in the world of replantation, but it is a success in some cases. We are under obligations to the author of the paper. There is no danger of any one being led astray by it. He isn't responsible for what he can't help, and when he can't save the pulp he will destroy it, and try to save the tooth in that way. If there is any professor in Philadelphia, or anywhere else, that has any method by which he can save all teeth, he (Dr. Sturgiss) would like to be under his instruction for a while.

Dr. Robertson, of New Hampshire. The pulp has no connection with the dentine, and therefore cannot supply it with nourishment. Nature abhors a useless thing as much as it does a vacuum. The tooth is nourished by the periosteum. Any person, however, who claims that the pulp is of no use, has not studied the anatomy of the tooth.

Dr. Ingersoll regretted that he had been misunderstood. Dr. Barker assumed that he denied to oxychloride of zinc and creasote the effects usually ascribed to them, but such was not the case. We have overestimated the value of the pulp. He had known a case where a pulp had been destroyed for forty years without extirpation, and the tooth was still sound. Twenty-five years ago the universal practice was to devitalize when there was an exposure, and if the work was thoroughly done the teeth are doing good service to-day. In ordinary cases it might be good practice to use oxychloride, but his doctrine was that in bad cases of suppuration it was not best to tamper too long with the pulp. The pulp is failing, and you are much more likely to have trouble than if it died voluntarily. It is a question between a doubtful and a sure practice. It is a much more sure treatment to devitalize. We are misled by the term exposure. There are cases of mere irritation, which are reported as exposure. The pulp is a formative organ, and when that function is performed, the tooth is so complete as to need little support. The great point is to save the periodonteum, which is endangered by treatment with a view to save the pulp. The objection to making the attempt is the thousand and one failures to preserve the tooth.

Dr. Allport. Thirty years ago it was a debatable question whether the tooth could be saved at all when it had ached. There had been a great advance, and there was no longer a question. Teeth have been made good and useful for years. It is important to save the pulp when we can, but he is convinced that we have overestimated the importance of it. Sometimes instead of being a benefit it is a nuisance.

Dr. John Allen. There is probably not so much difference of opinion after all. One point should be kept in view,—constitutional diathesis must be considered; also the condition of the tooth, whether badly exposed or otherwise. One treatment will not do in every case. Medical men make many failures, though they may use the same remedies.

Dr. Atkinson said he was both pained and pleased. He was pained to see men of intelligence fall short of looking the ground wholly over, and pleased that any protest had been made. Some execrable anatomy had been pronounced here to-day. When men say that the fibrils of the root are not supplied from the pulp, while the crown is, they are painfully ignorant. The fibrils can be drawn out of the dentinal canals. He wanted to indorse the paper in all the things that he didn't find fault with. He would give fifty dollars for a specimen of a human tooth that was perfectly calcified. He has never seen one. Instead of saying that we have overestimated the importance of the pulp, would it not be more modest to say that we make too little of being able to treat pulps that are in a pathological condition? He would as lief you would throttle one of his babies as to kill the pulp in his tooth. It is the same thing to kill a pulp as to take off a leg, only on a smaller scale.

Dr. Ingersoll asked how the remaining end of a pulp could help to preserve a tooth.

Dr. Atkinson said that half a truth is the biggest kind of a lie. The trouble is that nonsense is made an equal factor in a complex question. When the pulp is destroyed paralysis and atrophy ensue; in removing it the end is wounded, and some of the worst forms of facial neuralgia are sometimes caused. It may even run back to the root of the brain, and set up a difficulty there. If one understands it, it is as easy to treat inflammation as falling off a log.

Dr. Allport asked of what use the pulp was when abscess exists?

Dr. Atkinson said those cases were so few that it was not worth while to inquire.

Dr. Allport mentioned two cases of abscess while the pulp was still alive.

Dr. Crouse bore testimony in favor of saving all the pulps possible. He thinks there is a misapprehension in regard to a tooth having a live pulp in the root when there is an abscess; he had never seen one. He was glad to see symptoms of reformation at Philadelphia; he was glad that they were trying to save pulps. The impression has been given there that pulps can't be saved, and it takes students two or three years when they come away to get over it. He doesn't want any better practice than to cap all freshly-exposed pulps; he would rather undertake to cap than to take the chances of extirpation. There was a time when he used to caution patients as to possible failure when he capped a pulp, but his failures had been so few that he had abandoned that practice.

Dr. Barker said he had always been found in the front rank, and he wished to progress and keep in an advanced position.

Dr. Rehwinkel, of Ohio, said he had supposed that it was long ago settled that in a case of simple exposure the pulp should not be destroyed; he took that as a matter of course. Where there was inflammation, with some sloughing, it was a different question. It is well to give the pulp a chance, and see whether it cannot be saved. Oxychloride may be the thing, but in his hands it is the most treacherous and deceitful thing he can use. Pulps treated with it appeared to be alive when they were dead. It is an assassin in the dark, and covers up its track. Frequently you have no pulp, but a perfect Egyptian mummy there, which may give trouble at any time, especially if the foramen is open, and fluids get in there. When there has been extensive sloughing, the treatment should be different. If he had to risk his reputation on a tooth he would devitalize it; he considers the risk in capping ten times as great. The paper may be overdrawn, but there is a great deal in it to which he heartily subscribes.

Dr. Morgan. The paper implicates the profession in doing what they don't do. Two of the classes of exposure named in the paper are not exposure. He does not like this charge upon the profession. There might be a case of abscess with a live pulp, in a three-rooted tooth, but not in any other kind. It is said we overestimate the value of a tooth or a pulp. How can their value be estimated? Whatever the estimate, it is never an overestimate. He would not take any money for one of his teeth.

Dr. McDonald, of Pennsylvania, thought some things said in the paper might lead infants astray. He had met with both failures and successes. All could not succeed at anything. Failure is part of the history of mankind. The argument is that if the effort to save is a failure, further effort is useless. Our object should be to learn how to treat successfully. He hoped none would go home with a license to extirpate. All tooth-structure tends to deteriorate after loss of pulp. When the life of the pulp has departed, if it is thoroughly extirpated, the tooth will last a lifetime. When it has ached violently it should be extirpated. It has been urged that the attempt to save should be made; but our first duty is to preserve the usefulness of the tooth, and circumstances must determine the treatment. Every attempt should be made to save, and then we can resort to extirpation. What sort of a surgeon would he be that would fail to save a leg when he could? Conservatism is the thing for the dentist. We cannot tell what we can do till we try.

Adjourned.

Officers Elected.

As a matter of general interest, we publish in this place the result of the election of officers which took place on the evening of the third day, instead of waiting as usual until the report of proceedings up to that point is published. The following are the officers for the years 1877–78:

President.—F. H. Rehwinkel, Chillicothe, Ohio.

First Vice-President.—L. D. Shepard, Boston.

Second Vice-President.—George T. Barker, Philadelphia.

Corresponding Secretary.—M. H. Webb, Lancaster, Pa.

Recording Secretary.—M. S. Dean, 174 State Street, Chicago.

Treasurer (for ten years).—W. H. Goddard, Louisville.

Executive Committee (new members).—H. Judd, St. Louis; W. H. Morgan, Nashville; and Thomas Fillebrown, Portland, Me.

The next meeting will be held at Niagara Falls.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the society, held at the residence of Dr. A. C. Hawes, No. 18 East Seventeenth Street, Tuesday evening, April 17th, 1877.

President A. L. Northrop in the chair.

Incidents of Office Practice.

Dr. Wm. Jarvie, Jr. Some two or three meetings ago, the attention of the society was occupied with the subject of the transplantation and replantation of teeth. I have recently had an interesting incident of office practice which would naturally come under that head. About three years ago a little girl, nine years of age, was brought to me late in the evening, who early in the afternoon had had one of the upper central incisors knocked out by a croquet-mallet. The tooth had then been out some seven or eight hours. The mouth was much swollen, and the gums very sore. I removed the pulp, filled the root with gold, and replanted the tooth. In the course of time it grew firm, and one year after that seemed to be in very good condition, and gave every indication of remaining in the jaw permanently. A few months ago I saw the case again. A retrograde action had taken place in the meanwhile; the tooth was loose and showed symptoms of exfoliation. Two weeks ago I removed the tooth. It came out very easily. There was an attachment to the periosteum on the anterior proximate surface of the root only. Absorption had taken place, rapidly removing more than a quarter of the length of the root, and leaving the gold with which it had been filled standing almost alone, a very fine film of bone remaining on one side of the gold.

(Tooth shown.)

Dr. John Allen. A case similar to the one just referred to occurred in my own practice some time since. Four teeth had been knocked out by a horse, and they lay in the sand some little time. It was in warm weather. I was sent for, had the teeth collected, washed, and properly prepared to be returned to their sockets. I then replaced them, fastening them with ligatures for the time being, and those teeth all grew firmly in the jaw and retained their color. They were out of the mouth, I should think, for two hours.

I was once called upon to insert a pivot-tooth for a lady, and, in drilling for the pivot, I found that absorption had taken place at the end of the root. I remarked that there was something singular about it. "Stop," said the lady, "I must tell you. That is the tooth of my negro boy. A number of years ago the tooth that was there became decayed. I sent for a dentist, who extracted my tooth. I then had a tooth taken from my negro boy, and inserted in place of it, and I have worn it ever since. The crown has decayed away, and I want a new crown put upon the stump." This I did for her.

Question. Did you fill the roots of the teeth that were kicked out by the horse?

Dr. Allen. No, sir. My impression is that the nerves united again; but I can't say positively. I only judge from the fact that the teeth retained their color.

Dr. A. C. Hawes. I had recently the pleasure of elongating an incisor-tooth for the purpose of repairing a fractured corner. The idea was suggested by Prof. Barker, at our January meeting. On trying the experiment, I found I could draw the tooth down readily and restore the former shape. I made a plate with a little spring of gold running below the tooth. To this gold I tied the tooth, and in three days it was drawn down so as to be even with the other teeth, and looked as well as it ever did.

Dr. Atkinson. How did you hold it?

Dr. Hawes. Tied it down.

Dr. Atkinson. How long do you propose to hold it?

Dr. Hawes. I don't know. As long as is necessary, however; but, as this is a new experience to me, I don't know how long it may be.

Dr. W. A. Bronson. Some weeks ago a gentleman who had been for some time a patient of mine complained of excessive soreness of the right central incisor, a tooth normal in appearance, having two fillings of very moderate size on either proximate surface, but tender to touch and to cold and heat. I could see nothing out of the way in the tooth, and made some little application, not thinking anything was needed. Some three or four weeks after I filled the other incisor, and during the operation he suffered extremely in this other tooth, every blow of the mallet giving him pain, as he told me afterwards. In two weeks he came in, saying that he had "had an awful time" with the tooth, and his face was swollen. On raising the lip just above the tooth there was seen a gum-boil as large as the end of my little finger. I said to him whatever doubt there might have been heretofore there was no doubt now as to what was to be done. I put him in the chair, and attempted to reach the pulp-cavity from the palatine side with the engine bur. I had drilled but a little distance when he began to show signs of great pain. I laid away the engine and took a hand-drill, but I soon found that the pulp was alive and healthy, still with this large pustule on the apex of the root. With the scissors I cut that off and probed, but could detect nothing so far as I could reach. I dressed, I think, with chloride of zinc, and the tenderness of the tooth has for the most part gone. It was an error of diagnosis, which may mislead a good many.

Question. What do you suppose was the trouble?

Dr. Bronson. All I could find was a gum-boil.

Dr. Atkinson. It *was* a gum-boil, and nothing else.

Dr. Bronson. I could not detect the root or the alveolus in probing.

Dr. S. G. Perry. I had a similar case some months since. A fistula appeared over the tooth, an upper molar, and every tooth on that side responded promptly to ice. It healed, and there is no trace of it now.

The secretary read a paper on "Devitalized Teeth and Their Management,"* by F. H. Rehwinkel, M.D., Chillicothe, Ohio.

Dr. A. H. Brockway. I suppose we are all full of the subject, waiting for the first stone to be thrown. It is, as has been said, a subject we are all interested in, but one in which we are not so much interested as we were a few years ago; for I believe that the practice of destroying the pulps of teeth is falling into disuse. I am sure in my case it is very marked. I rarely have occasion now to make an application of arsenic. I consider that the method described in the paper, while it is necessary with some few cases, is rather complicated, needlessly so. I have in the course of twenty-two years' practice destroyed a great many pulps, I am sorry to say, but I never yet have seen a case of the trouble described by the writer from the use of arsenic. My method has been to clean out the cavity sufficient to expose the pulp, and apply a little arsenic on a minute pellet of cotton moistened with creasote, directly to the pulp, laying over that a loose pellet of cotton, and melting a little wax in a spoon and pouring it on the cotton. It is a method as simple as I can conceive of, and almost never results in any pain to the patient, and so far as I have observed, is entirely without danger. I speak of my method because I think the process of Dr. Rehwinkel is needlessly complicated. As you know, I am an advocate of simplifying matters as much as possible.

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* This paper appeared in the September number of the DENTAL COSMOS.

Dr. S. G. Perry. I am so well pleased with the application of oxide of zinc with creasote over exposed pulps, that I am almost ready to agree with Dr. Atkinson when he says nearly all exposed pulps can be saved. I hardly ever have any trouble after capping in that manner, even with badly exposed pulps. I have sometimes found that even if the pulp did not remain keenly alive, yet it still retained considerable vitality, and that is of importance with young persons. I should venture to devitalize a pulp for an elderly person quicker than for a young one. Devitalize a tooth under fifteen years of age, and unless it be in a healthy mouth, you will be pretty sure to lose it eventually. It is not sufficiently ossified to be depended upon later in life. No matter how carefully the filling may be placed, you may be sure that the time will come when that tooth may be counted as one of the lost. For young persons, therefore, I should be very careful in that treatment.

Dr. Cook. Will Dr. Perry explain what he means by retaining considerable vitality in a pulp which is not alive?

Dr. Perry. I have seen pulps that have struggled along, balanced between life and death for several years, in the mouth of a young person. I would rather have a pulp in that condition than have it entirely destroyed and removed. That is what I mean. I suppose we have all seen pulps that were barely alive, and yet not by any means dead, but hanging between life and death.

Dr. Cook. Do you think a tooth with the pulp in that condition would become any more dense?

Dr. Perry. I think it might, though not so rapidly as if in a healthy state.

Dr. Cook. Do you look for the permanent death of that tooth in the end, or do you expect it will be restored to health?

Dr. Perry. I should expect to devitalize it eventually. For a middle-aged or elderly person I should devitalize it at once, particularly if the exposure was very large. In the mouth of a young person I should also destroy it at once if I thought there was danger of its dying soon. I would not run the risk of the discoloration of the tooth. Not by any means. Nor would I cap such a pulp without having it closely watched.

Dr. E. A. Bogue. Although not exactly in the line of the discussion this evening, I think a collateral branch is of sufficient importance to give a little remark to it. I have had some experience in it during the past week, and although we are not fond of telling our failures, I will tell mine. I undertook to treat a first lower molar for an abscess. It had been treated for some months in Boston by a very reputable gentleman, however, and at last, after some months, the tooth was extracted, and still the abscess did not get well. *I didn't have any success.* At last I had occasion to examine the posterior side of the second bicuspid, and on attempting to fill it I found it was a dead tooth. I treated this tooth, and the abscess at the root of the extracted molar got well. About four months passed and the same patient came in and complained of the upper bicuspid, saying that it gave great pain. I put on a leech and the pain stopped. Two days after, the patient came in again. After a pretty careful examination I found the first bicuspid that had been filled seven years ago was the one that was causing the pain, though she claimed that it was the *second* bicuspid. I drilled into it and found the pulp dead. The patient was relieved in the course of ten minutes. The filling did not touch the pulp, which was nowhere exposed that I could see, and seven years had passed from the time the filling was put in until the tooth began to give pain. I suppose I might go on for some time relating such cases. If, now, Dr. Perry can tell us what he does to avoid that sort of difficulty I shall be very thankful, for I happen to know what he does, and I want others should know too, as I believe he avoids all unnecessary risks.

Dr. S. G. Perry. I don't like to take any risk where my patients are concerned. I should not put a permanent metallic filling near a pulp, whether it be exposed or not. I should treat a nearly exposed pulp exactly as if it were exposed; the same care with one as with the other. At a recent meeting of the District Society I detailed my method of managing exposed pulps. I think I said I never filled a tooth permanently until I had seen good evidence of a new formation of tissue. To cap a pulp and fill permanently, *assuming* that it is all right because not painful, is a method too unsafe to think of for a moment. I don't think I ever did such a thing. If I ever filled a tooth for a young person with a metallic cover over the capping, it was only to be considered a temporary filling; never a permanent one. The patient is never to suppose that it is complete and final. They are given to understand it is doubtful. They are also distinctly given to understand why it is left in that manner, and they are instructed to report at once if any uneasiness occurs. Such a tooth is also tested with ice at every quarterly or half-yearly examination. It is not surprising that having grown up as we have, with the notion that pulps must be destroyed,—as the Irishman says, "whenever you see a head hit it,"—it is not surprising that we should slowly shake off that notion. I must confess that formerly I believed that teeth could not be generally saved by capping the pulps. But have we not all seen teeth where the pulps have exhibited remarkable tenacity of life,—have persisted in living in spite of our bungling operations on or over them? Having seen so many of these cases, and having had such good results from careful conservative treatment, has led me to believe it is not often necessary to destroy the pulp, keeping that as a last resort.

Dr. E. A. Bogue. I do not think it just that a paper that comes before us in this way should be taken as advocating any particular method. If I am mistaken, so be it, but I look upon it as being simply the statement of a gentleman who is pretty well qualified to make his own statements of his practice under certain circumstances, and the peculiarities of that practice. Now, about one point which he mentions in his paper. He uses the chloride of zinc for the purpose of "mummifying" any remnants of pulp that may remain. I take no exception to that, but, on the contrary, there are cases, I fancy, in which a good deal of care is required if chloride of zinc be used. I had another failure, lately, in this direction. I undertook to use chloride of zinc in the case of a tooth which had been discharging pus for years. I took out the filling and made an application of glycerole of thymol, and it seemed to produce no effect. I then made an application of chloride of zinc. That produced an effect decidedly, as I found out next day, and the patient found out before me. If he had not been a very patient patient he might have raised a rumpus. The upshot is that twenty-five days afterwards I took out a portion of the alveolus, together with the septum from between the roots. I then found that through the pulp-cavity in the tooth there was a large opening leading between the roots. I cannot say how much the necrosis was increased by the application, but I think it was increased without any doubt. To my mind it is conclusive evidence that the remedy is to be handled with more care than I handled it in that instance. In that same connection I would call the attention of the gentlemen present to Dr. Dean's experiments on antiseptics, which I suppose most of us are in a larger or smaller degree repeating. In a paper by Mr. C. Spence Bate, read a year ago, he noticed the antiseptic properties of glycerine, and Dr. Dean carried the matter so far as to get animals and cover them, some with glycerine, others with arsenic, and others with creasote, and the first lasted the longest, without undergoing putrefactive decomposition.

Dr. Frank Abbott. There is one point that Dr. Rehwinkel has raised which is very interesting indeed to me, and that is the action of malarial poison upon the teeth. I want to know whether it is a fact, that where people live in malarial districts the pulps of their teeth are more susceptible to irritation than in other localities. That the excessive irritability is due to the action of malaria I have serious doubts. I don't believe that malaria has anything to do directly with the decay of the teeth. I would like to hear the opinion of some gentlemen who have studied this subject perhaps more thoroughly than I have. I am yet to be convinced that it is a fact. I should take some exception to the position taken by our good friend, that from the fact that he lives in a malarial district he cannot treat exposed pulps in the same manner that they are treated successfully in the city of New York, for instance, or any other locality where they are treated with the same care as they are here. As I understand the paper, he destroys the pulp when exposed, and gives as a reason that he lives in a malarial district, and can't treat them successfully in any other way. I am ready to be convinced that he is correct, but would like an explanation of the reasons why. Teeth undoubtedly do decay more rapidly in such localities than in others. I attribute the cause not to the malarial poison, but to the remedies used to destroy that poison,—the principal one of which is *quinine*,—when prescribed in a liquid form. Quinine itself does not act upon the teeth, but the sulphuric acid, in which it must be dissolved, does act upon them readily. An anæmic condition accompanies nearly every case of malarial poisoning. For this the tincture of the chloride of iron is usually prescribed. That this remedy affects the teeth very injuriously I think no one will deny.

In the filling of pulp-canals there is an objection to this rubber or gutta-percha treatment advocated by the author of the paper. Unless you are careful you will force it through the foramen at the apex of the root, and then you can readily imagine what the trouble will be. I know a gentleman, in this room now, who filled the pulp canals of teeth with gold wound on the point of a broach. He wound it so that the fold was sharp and stiff. He would drive it into the canal of the tooth, and it would not one-half fill it. It would stop when it got in a little way. In removing a crown-filling of his, this root-filling dropped out, and not a particle of anything remained in the canals. I don't believe that it is absolutely necessary that the canal of the tooth should be filled, although in my judgment it is better if it is done carefully and thoroughly. The way I manage such cases is to cleanse the canals as thoroughly as possible with tepid water, with a small quantity of carbolic acid solution in it. The idea that we can cleanse the canals perfectly is nonsense. The molars of the upper and lower jaws, and more especially the wisdom-teeth, have such small and tortuous canals that it is out of the question to expect to succeed in removing all the decomposed pulp from them. When that is the case, something has to be done to render the parts in a condition that they shall not give trouble : we have all used creasote, carbolic acid, and salicylic acid. It may be due to the locality, but in this vicinity these remedies have proved very reliable in their antiseptic properties. I take a small pellet of cotton wound upon a broach, and wipe the canals out as thoroughly as I can. I then take a small bit of cotton, or perhaps gold, and carry that as near the apex as possible; after saturating another piece with creasote or carbolic acid I carry it into the canal until it comes in contact with the previous piece; I then fill with gold, gutta-percha, oxychloride of zinc, silk, cotton, whichever in my judgment is best adapted to the case. Suppose your patient returns in a day or two after such an operation, with the tooth aching and very sore to the touch, what would you do in such a case? Some recommend leeches (a disgusting operation to the patient), some oil of cloves, some cantharidal collodion, some an emetic, and some a powerful cathartic. I believe I have tried nearly all of them, but in nearly every case with doubtful results; in other words, they failed to relieve the patient. For the last ten years I have used a saturated tincture of aconite root mixed with an equal amount of tincture of iodine; I apply it to the gum every three hours until slight improvement is observed by the patient. This in my hands is a never-failing remedy if applied before suppuration takes place. I have never failed in curing an abscess where I have had an opportunity to apply this remedy early. The aconite is an arterial sedative; when taken internally it retards the operations of the heart, influences the circulation of the blood. Applied locally, it acts in the same manner, whether it is by the contraction or expansion of the arteries is not a settled question; what the action is I have never had a chance to ascertain, but that it does influence the circulation of the blood at the point of application there is no doubt. Iodine is simply a lymphatic stimulant, and wherever it is applied the parts are stimulated to greater activity.

Question. Would not the same result be obtained by using the aconite alone?

Dr. Abbott. Positively no, because I have tried it many times.

Dr. Bogue. What do you mean by a saturated solution of aconite?

Dr. Abbott. The saturated tincture of aconite root is obtained by evaporating the alcohol from the ordinary tincture until only one-quarter of the original amount remains.

Dr. W. H. Atkinson. Of the remarks upon the paper, many of them have been made in such a manner that it is doubtful whether we have been benefited. I want to say a word or two with regard to the fairness with which we should deal with every paper that comes before us. It is eminently proper for us to treat a witness with the same respect that we would claim for our own statements. I personally know and love F. H. Rehwinkel. He is competent to tell his own story, and I will believe his word or his oath as quick as any man's I know, save one. As to his competency, he has already notified those who didn't know it before, that he had practiced medicine before he entered dentistry. Now, we must deal with his facts and his conclusions with such ability as we have. I don't agree with the doctor in his conclusions, and I don't accept the necessity that he assumes to be a result of malarial conditions. But that malarial conditions have nothing to do with the vitality of dental pulps simply resolves itself into a question whether we understand the difference between physiological and pathological action. We sometimes draw conclusions that are not warranted by our observations, and until we know more minutely the changes that occur in the proper calcification of the teeth we shall not be able to do a great deal more than advance opinions, put forward as some have been to-night, as the last word of truth respecting the matter. Those finalities we have not yet arrived at. The antidote goes with the paper, for if we read it closely we see that the writer holds that it is next to impossible to extirpate pulps to the ends of the root. I guess any man who has made an honest effort to do it will not controvert that point. If the means that he refers to are to be used at all, I hold that they should be used only when they are necessary. How many pulpless canals do you suppose are carried in the mouths of patients with nice fillings in their teeth, and they know not of it until malaria debilitates the organs to such an extent that there is disintegration to such a degree as to incite into action latent diseases? There are hosts of such. How many of us have in removing defective fillings found empty chambers, and how many of us have had our faces burn and our hearts wrung with finding them! The paper is too far in its reach to be discussed with anything like profitable fairness, and refers to a second paper, and I don't think we can really do the subject or the writer justice until he has fully pronounced himself.

Now, what is the real condition in which a disease can present itself? It never presents itself in dead tissue. It is always at a point between the living and the dead that disease is formed. It is always immediately between the point that is able to enter on nutritive action and the point that is unable to do that. Who ever saw an alveolar process with the chylopoetic system in good condition? I venture to say, no man. Where the liver is out of order, as it almost always is in malarial regions, we will have a poorly-prepared pabulum. That is where we get our disease. I am glad to hear as much reference made to the general force of medicinal treatment as has been made to-night, but when we get to be more familiar with the taking charge of the putting of patients in good condition, we will have fewer diseases. If we could relieve the system always where there are exposed pulps, I think we would always find there was no necessity for destroying them. I am glad if any have seen the truth. Men who are the closest observers are willing to believe that some one else knows something. Those who are surface-minded cannot realize that anybody knows anything but themselves. I should be happy to take hold of this question and discuss it logically, physiologically, and pathologically, so that we may answer many of the questions that have been put forward.

Finally, as to whether calcification would go on in teeth where the pulps were partially devitalized and were protected by temporary fillings. There are two processes. One is regular, a dentinification of the elements that make up the tissue of the tooth, and the other is calcification. I would emphasize what Dr. Perry said in entering a caveat against destroying the pulps of young children's teeth.

Dr. Abbott. Do I understand that calcification can take place after the pulp is dead?

Dr. Atkinson. I said, partially devitalized and covered with temporary filling.

Dr. S. G. Perry. Did you understand me to say that?

Dr. Abbott. I understood you to say that a tooth after the pulp had been destroyed has a tendency to become more solid.

Dr. S. G. Perry. I think it would be better for me to keep still if there is so much danger of being so completely misunderstood. To more clearly express my meaning, let me relate a case that came under my observation the other day. Four years ago I capped a quite largely exposed pulp for a young man who was then about seventeen or eighteen years old. A thin layer of Hill's stopping was placed over the exposed portion, and the rest of the cavity filled with oxychloride of zinc. According to my note-book, two years after the pulp was uncovered, found alive, and recapped in the same manner. The other day,—two years later still,—the filling having become badly worn, the pulp was again uncovered. It was alive and in about the same condition as my record showed it to have been before. I recapped with a paste of oxide of zinc and creasote, and covered with the oxychloride of zinc. Here is a pulp so largely exposed that the odontoblasts are destroyed, and I cannot hope that the opening will ever close. I expect eventually to destroy that pulp. But it has now been left four years and is still as much alive as ever, though in a sluggish state just at the point of exposure. My notes say that a little blood oozed out at each capping. I don't know why that pulp may not remain in the same state for four or eight years more; and will any one say that at the end of eight or twelve years—remembering the age of the patient—that will not be a denser and better tooth, and in a better condition to be devitalized? Of course, there is some risk, but it is reduced to a minimum by enjoining great care on the part of the patient. This is what I meant by urging care with young teeth, even if the pulps are in a partially sluggish state. If the patient had been forty years old, I would have devitalized that pulp at once.

Dr. C. E. Francis. I think the paper that we have had to-night has hardly been fairly treated. The paper does not touch upon the salvation of pulps, and yet that seems to have been the subject most discussed. I didn't understand that Dr. Rehwinkel is in the habit of destroying all exposed pulps. I think a man who is as careful as his paper would seem to indicate that he is, would be capable of saving pulps. I think myself it is always better to save a pulp than to destroy it, but I have thought the practice of trying to save pulps that are nearly dead is often a very fatal performance. In regard to saving the roots without teeth. A gentleman called on me recently who had a tooth broken twelve years before. The root was filled with cotton and capped with gold. I removed the gold and found the cotton dry and clean and not offensive. But yet I think the best method of filling roots is the method described in the paper, viz., filling with oxychloride of zinc.

Adjourned.

AMERICAN DENTAL SOCIETY OF EUROPE.

The American Dental Society of Europe held its fifth annual meeting on the 1st, 2d, and 3d of August, in Interlaken, Switzerland. The following members were present: Drs. Abbot, Paetsch, and Fuchs, of Berlin; Drs. Field and Pritchard, of London; Drs. Crane and Kingsley, of Paris; Dr. George Fay, of Brussels; Dr. William Sachs, of Breslau; Dr. N. B. Gregory, of Lyons; Dr. E. C. Young, of Leipzig; Dr. J. G. Van Marter, of Florence; Dr. N. W. Williams, of Genève; Dr. C. M. Wright, of Bâle; Dr. A. B. Doremus, of Zürich. President Dr. George W. Field in the chair. Letters from many absent members, regretting their inability to be present, were read by the secretary.

Two days were consumed in the discussion and adoption of a new constitution, which limited the time for discussing the following subjects:

Essays.

1st. Irregularities of the Teeth, their Causes and Treatment.

2d. Caries of the Teeth, Causes and Treatment.

3d. Is it desirable to separate Operative and Mechanical Dentistry?

4th. National Types of Teeth.

5th. What Materials are best for Filling and Preserving the Teeth between the Ages of Twelve and Fourteen?

ESSAYISTS.

Dr. Charles A. Kingsley, Paris; Dr. John W. Pritchard, London.

Dr. James Truman, Hanover; Dr. N. W. Williams, Genève.

Dr. George W. Field, London; Dr. Frank Fay, Brussels.

Dr. N. S. Jenkins, Dresden; Dr. J. G. Van Marter, Florence.

Dr. C. M. Wright, Bâle; Dr. James Truman, Hanover; Dr. A. B. Doremus, Zurich.

In addition to the above, two interesting voluntary essays were read: one from Dr. C. V. Du Bouchet, of Paris, on the "Treatment of Periostitis" by means of an instrument called the "Aspirator Du Bouchet;" the other from Dr. Truman, of Hanover, on the "Effects of the Mineral Waters of Germany on the Teeth."

Among the visitors were Drs. Gardiner and Edwards, of Madrid, Spain, and Drs. Muridge and Greenfield, of London.

The following officers were elected for the ensuing year:

President.—Dr. C. M. Wright, of Bâle.

Vice-President.—Dr. Charles Kingsley, of Paris.

Secretary.—Dr. A. B. Doremus, of Zürich.

Treasurer.—Dr. N. W. Williams, of Genève.

After the usual banquet the members of the society parted, to meet again in Paris on the first Monday in September, 1878.

A. B. DOREMUS, D.D.S., *Secretary.*

CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

THE annual meeting of the Central Pennsylvania Dental Association met at Tyrone, Pa., July 18th and 19th, 1877.

The following officers were elected for the ensuing year:

President.—Dr. J. M. Stewart, re-elected.

Vice-President.—Dr. M. L. Logan.

Secretary.—Dr. J. S. McKiernan, re-elected.

Corresponding Secretary.—Dr. W. H. Buchanan.

Treasurer.—Dr. J. C. M. Hamilton.

Drs. Hamilton, Isenberg, and Logan were continued as Board of Censors.

Adjourned to meet in Tyrone, Pa., on the third Wednesday in January, 1878.

J. S. MCKIERNAN, *Secretary.*

CORRESPONDENCE.

"THE AMERICAN DENTAL SOCIETY OF EUROPE."

Dear Cosmos,—The fifth annual meeting of the "American Dental Society of Europe" took place in Interlaken on the 1st, 2d, and 3d of August. About twenty of the old members, from different parts of Europe, arrived at the opening of the session; some coming with sunburned faces from journeys over the grand old mountain passes, others from the lakes of Thun or Brienz. Interlaken is situated on a piece of land between these lakes, and is surrounded by grand mountain scenery. That stately beauty, the Jungfrau, overlooks the town, and presided, as it were, over the discussions of the society, for at any time the members could be warmed into enthusiasm by a glance through the windows of the saloon in which they met at the cold, glistening, snow-covered point of this most beautiful mountain. The cities represented in the society were Berlin, Paris, Breslau, Brussels, Lyons, Florence, Geneva, Bâle, and London. Drs. Gardiner and Edwards, of Madrid, and Drs. Muridge and Greenfield, of London, came as guests, and participated in the discussions. A new constitution was adopted, and the Code of Ethics of the American Dental Association accepted.

An able essay on the "Causes of Irregularities of the Teeth" was read by Dr. Charles Kingsley, in which stress was laid on the effect of thumb-sucking in infancy. The effects were demonstrated by models, and the methods of treatment and the progress of the cure were explained and demonstrated. In the discussions on the subject, the general opinion was adverse to the American theory that the intermarriage of persons of broad with those of narrow maxillaries causes the irregularities so common in this generation. The luxuries of the century, the preparation of food in such a manner that mastication and exercise of the organs are no longer so essential, the high-pressure plan in the education of children, developing the nervous system in advance of the physical, etc., were offered as causes. The lack of the phosphates in prepared food and the necessity for a supply of these bone-making materials in the form of food or medicine was generally admitted. An interesting essay on the subject of "Causes of Decay of Teeth," from the pen of Prof. Truman, of Hanover, was read by the secretary. Also one from the same author on the "Effects of Mineral Waters on the Teeth." Analyses of the waters of many of our popular watering-places, or cure-places, were given, with experiments and theories regarding their direct and indirect effects on enamel and dentine; the summary being that these waters do not injuriously affect the teeth in producing caries. The profession would be greatly obliged and benefited if Prof. Truman would permit this paper to be published. The subject of the "National Types of Teeth" was considered of so much interest and value to the profession that it was continued indefinitely on the list of future subjects for discussion. Dr. Van Marter presented an elaborate essay on this subject, making comparisons between the teeth of the Tuscans, who seem to be the race par excellence for good teeth, with the Swiss, who, in common with Americans (the modern Anglo-Saxon races of America), suffer the most from irregularities and poor quality of teeth.

On the question of whether it is "practicable to separate the mechanical from the operative branch of dentistry," Dr. Abbot, of Berlin, remarked that it had ceased to be a question with him for twenty-five years. He had pursued the operative exclusively in his practice in Berlin. Drs. Field, Kingsley, Van Marter, and others argued the question warmly, Van Marter and Pritchard insisting that the so-called operative part is in truth the purely mechanical, requiring mechanical skill, while the so-called mechanical branch should be distinguished as the artistic part, etc.

The last subject, in regard to the best materials with which to fill the teeth of children of the ages of twelve or fourteen, was opened by essays from Prof. Truman and Dr. Wright. The discussions following gave the idea that the majority of the members on the Continent are in favor of the tin and gold combination filling which this society had the honor of publicly recommending to the profession through Drs. Abbot, Jenkins, Paetsch, and others of Germany, in the session of 1874, at Geneva. Since that time other members have experimented with the filling, and with considerable satisfaction in these imperfectly-developed teeth of children. That it is chemically and electrically better than gold in these cases is believed, and that it becomes harder than tin alone is acknowledged. It has also been used in approximal fillings at the cervical walls—the rest of the cavity being treated with gold—with good success. Dr. Abbot has had some fifteen years' experience with this combination, and unhesitatingly recommends it for children's teeth or in teeth of the white, chalky variety. We should be glad to have the opinions of our friends at home and of our English brothers upon this combination of materials in filling. It is evident from the tone of our periodical literature of to-day that gold is not the best material for a certain class of teeth. A dissatisfaction exists among our best operators about the temporary character of gold in children's teeth; and while many use gutta-percha where they formerly employed gold, but few apparently have either the courage or the inclination to try this combination. It is used in several forms; but the originators recommend tin and gold sheets laid together and rolled in a rope, and applied with lateral pressure, wedging the filling into the cavity.

The society adjourned to meet in Paris on the first Monday of September, 1878.

In the evening a banquet was partaken of by the society in the Hôtel Ritschard, the discussion of which was made doubly agreeable by the presence of a number of ladies, wives of the members. The usual number of toasts were offered and responded to: "To the ladies;" "To our absent wives;" "To our guests;" "To the new president;" "To our retiring president," etc.

We are glad to be able to state to you, Mr. Editor, and to your numerous readers that the little society, born on the top of the Rigi, July 4, 1873, and christened with such a big name by five dentists of Switzerland, has become an "institution," to use an Americanism, to the American dentist, who had been cut off by circumstances from the interesting and instructive association with those of his own profession, and from the society meetings he so much valued at home. When men leave their homes in London to cross the Channel and travel, with many inconveniences, and during their busy season, to far-away Interlaken, among the snow-capped Alps and Swiss lakes, to attend a dental society, we can easily imagine how important they consider the meeting. When men travel from Madrid to Interlaken to be guests for a day or two to hear dental subjects talked over, we can believe in the necessity of a dental society over here. And we are but five years old. Are we not right in believing in a still better future for our society? W.

BÂLE, SWITZERLAND.

BIBLIOGRAPHICAL.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION, at its Sixteenth Annual Session, held at Philadelphia, August, 1876.

This is a creditable volume of two hundred and thirty pages. The delay in its publication detracts, however, from its value. Papers a year old are not likely to be read with the same interest which would attach to their earlier publication.

TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY, Thirteenth Annual Session, held at Springfield, May, 1877.

The need of an experienced reporter in the preparation of these discussions for publication is apparent throughout the report, as also the need of more careful proof-reading to correct typographical errors. Several of the papers and the discussions which followed are interesting and valuable.

AN INDEX OF DISEASES AND THEIR TREATMENT. By THOMAS HAWKES TANNER, M.D., F.L.S. Second Edition. Revised by W. H. BROADBENT, M.D., etc. Philadelphia: Lindsay & Blakiston, 1877.

This volume was prepared to facilitate the daily work of the medical practitioner. Under some sixty general headings, subdivided into nearly one thousand, a brief description of each disease is given, its symptoms, and treatment. Numbers are appended to the drugs named, referring to an appendix of formulæ, of which perhaps nearly one thousand are presented.

Such a book, while serving no useful purpose to the student, is convenient to the practitioner as an index or classified condensation of diseases and therapeutics. As a specimen, however, of the general lack of correct information by medical men on dental matters, we append the treatment of one form of toothache, the whole subject being presented under four headings, viz., toothache from caries, toothache from necrosis of fangs, toothache from inflammation of pulp, and toothache from neuralgia.

The treatment of toothache from inflammation of pulp is thus summarized:

"Aperients. Washing mouth with strong solution of bicarbonate of soda in hot water. Stopping tooth with cotton-wool, saturated with creasote, or chloroform, or oil of cloves, or tincture of aconite, or cajeput oil, or camphor in turpentine, or tannic acid in ether. A leech to gum. Chewing horseradish or ginger. Chewing pellitory (pyrethrum). Ginger poultice to face. Extraction. Drilling into pulp-cavity (rhizodontrypy) after stopping." As may be inferred, those conditions with which medical practitioners are more familiar are more intelligently handled.

JOHNSON'S NEW UNIVERSAL CYCLOPÆDIA. Vol. IV. New York: A. J. Johnson & Son.

We again introduce this cyclopædia to the notice of our readers chiefly to chronicle its completion,—a matter of congratulation to those who had secured the previous volumes.

The concluding volume appears to be not a whit behind those which preceded it, and contains many papers of the highest value for their completeness and accuracy.

As a whole, "Johnson's Cyclopædia" may be considered the greatest thesaurus of knowledge which has ever been compiled. We copy the following statements, which appear in the introductory to the index accompanying the fourth volume:

"The total number of articles bearing their writers' signatures is 8121; of articles by editors of newspapers, relating to local geography and statistics, 1694; and of writers selected for their special knowledge of the subjects treated, 6427."

This is in addition to the articles contributed by the editors-in-chief and by the associate editors.

THE PHYSICIAN'S VISITING LIST FOR 1878. Philadelphia: Lindsay & Blakiston.

This is a pocket companion admirably adapted to the needs of the physician. Its value may be inferred from the fact that this is the twenty-seventh year of its publication.

PERISCOPE.

COMPOSITION OF THE SKULL; ARCHITECTURAL PLAN OF THE SKULL; STUDY OF SECTIONS.—Of the three bony capsules connected with and supported by the spinal column, the *skull* is by far the most complicated and difficult for the student to master. Its offices are so numerous, its relations are so varied and minute with the vessels and nerves which pass through its fissures and foramina on their way to or from the brain, with the brain itself and its membranes, with the muscles attached to it, and with the organs of special sense which it encapsules and protects, that the work of many months would not be more than sufficient adequately to expound it and the structures with which it is connected. Nevertheless, the exposition of its anatomy and connections with muscles, vessels, nerves, sense-organs, and brain has to be compressed into a space of time which is entirely inadequate to do justice to the subject. Composed of twenty-two bones, it forms first of all a bony case to cover and shield the brain; secondly, a firm framework for supporting the soft parts which constitute the face an ever-varying index of the mind within, together with those accessory structures without which the "human face divine" would scarcely prove an agreeable object of contemplation; and thirdly, it furnishes capsules for the lodgment of the organs of sight, hearing, smell, and taste, which minister to man's necessities, preservation, and enjoyment, and canals for the passage of the food to the stomach and air to the lungs, without which life could not be maintained. On each of the accessory parts found in the skull—the organ of hearing, lodged in a chamber hewn out of the densest bone in the body, or, as Holden is pleased to term it, the solid rock; the orbit, with that most perfect of optical instruments which it incloses; the nasal chambers, performing the threefold office of an olfactory, vocal, and respiratory organ; the mouth, at once "the minister and interpreter of nature," guarded by the upper and lower jaws bristling with teeth—a separate volume might be written. It is the lecturer's unenviable task to condense volumes into chapters, that he who runs may read. The bones of the skull will be best described by adopting the ordinary division into bones of the cranium or skull proper, and the bones of the face. The bones of the cranium or brain-case are eight in number: occipital, two parietal, frontal, two temporal, sphenoid, and ethmoid. The bones of the face are fourteen: two superior maxillary or upper jaw-bones, one inferior maxillary or lower jaw-bone, two palate-bones, two nasal bones, two malar- or jugal- or cheek-bones, two lachrymal- or tear-bones, two inferior-turbinated or spongy bones, one vomer- or share-bone.

In this specimen the bones are mounted together and in relative position, but at a little distance apart, and you may observe the general arrangement. There are the single bones, which occupy a median position. Beginning from behind, and proceeding forwards, we have the occipital, forming part of the skull posteriorly and inferiorly, and distinguished by the great hole, or *foramen magnum*, which pierces it; then the sphenoid, reaching right across from one side of the skull to the other, and constituting with the occipital, in the adult, but a single bone; the spheno-occipital, in front of the sphenoid, the ethmoid- or olfactory bone, and the thin elongated vomer. All the other bones are arranged in pairs at the sides of these central bones. Here are two parietal, so-called because they form *paries*, a wall to the brain on the right hand and on the left. Here are the two temporal bones, distinguished by the external passage of the ear, by the zygoma, and the auditory capsule jutting into the skull, wedged in between the occipital, the sphenoid, and the parietal, and called temporal because the hair over them or near them first displays the ravages of time. Here is the frontal, a single bone, apparently an exception, you will say, to the division just made. Not so; for if you look at the bone at birth, it is not one bone but two, each half protecting its own half of the brain, and forming its own half of the brow or forehead, and constituting, therefore, an os frontis or frontal bone. In the face, again, the bones are arranged with great regularity in pairs, flanking the central perpendicular plate of the *ethmoid* and the *vomer*. Here are the two little nasal bones, forming the bridge of the nose; here the important superior-maxillary bones, contributing to the cavities of the orbit, nose, and mouth, and bearing the upper set of teeth; and there behind them, entering into the same three cavities, are the two palate-bones. Inside, the nose hangs on each side from the upper jaw-bone, the inferior turbinated; and in this corner of the orbit, between the *ethmoid* and *superior maxillary*, is a little ossicle, the lachrymal bone, grooved by the special canal for the descending tears. Suspended from the cranium is the horse-shoe-like lower jaw-bone, at birth consisting of two distinct halves, and therefore to be regarded rather as a pair of bones than a single bone; and lastly, symmetrically placed on either side, connecting the cranium and face, are the malar bones, termed from this function of theirs the jugal bones.

At first sight you might suppose that the bones of the skull were arranged in an intricate and incomprehensible manner, but it is not so. They are disposed on a definite plan in admirable order, and with the utmost regularity and design. Fully to comprehend the architectural plan, the method advised by Professor Huxley must be adopted, of making and studying antero-posterior and transverse vertical sections, which bear a definite relation to the principal axes of the skull. A vertical transverse section, or, as Continental anatomists call it, " a frontal" section of the skull through both external auditory passages, divides the skull into two unequal portions,—anterior and posterior. This skull—the skull of a New Zealander—has been thus treated; and you will see in each half a central part or floor, and springing from this floor arches which meet above to form the roof of the skull and inclose the brain. In the anterior half, we have a stout median floor interposed between the bones of the cranium and the bones of the face. The bones of the cranium pass outwards and bend upwards, in a curvilinear manner, to complete a chamber for lodging the brain; whilst the bones of the face descend to form lower arches, and inclose the chambers of the nose and mouth. These two cavities lie one above the other,—the nasal cavity above and the oral cavity below,—separated by a bony partition prolonged inwards from the palate and superior maxillary bones. Observe that the upper nasal chambers are smaller than the lower oral chamber, that they are divided into two passages by the *vomer* and *perpendicular plate of the ethmoid* descending from the roof to the middle of the palatine arch, and that they are flanked at the back by the processes which project from the under surface of the *sphenoid*, called the *pterygoid processes.* In the posterior half of the skull you see the stout median floor, formed by the *basilar process of the occipital bone* in front of the *foramen magnum;* whilst the upper arches are composed of the *parietal* and *temporal* in part, and the expanded portion of the *occipital.* In this section there are no lower arches. Suspended, however, from these long processes, the *styloid processes* of the *temporal* bone, by ligament sometimes converted into bone, as in the specimen on the table, is the small hyoid or U-shaped bone, which lies in the neck behind and below the lower jaw, surrounding the passage for the admission of air to the lungs. The *hyoid bone* is regarded as the lower arch to the posterior segment of the skull. The essential composition of the skull, then, is that of the rest of the trunk skeleton. Make a section of the thorax of a man placed in the horizontal position of a four-footed animal, and what do you see? Two canals separated by a median solid partition,—the vertebral column. The upper small canal is the spinal canal, the lower large canal the cavity of the thorax. The upper arches formed by the pedicles and the laminæ of the vertebræ are of small size, because the central nervous system here is a slender cylinder; the lower arches formed by the ribs, costal cartilages, and sternum are large, because they have to envelop and protect the heart and lungs. In the skull, the proportions of the two arches are exactly reversed. The central nervous system, the organ of intelligence, emotion, associated automatic and reflex actions, and will, is enormously increased in size, and requires a large chamber. Hence the expansion of the upper dorsal or neural arches. The lower chambers, ministering to the life of the animal in man, are comparatively small, and therefore the lower arches are correspondingly reduced. In man, the intellect was designed to predominate over the instruments of sense; the mind is intended to control the emotional impulses, which are caused by strong impressions upon the nerves distributed to the tactile, gustatory, olfactory, auditory, and visual organs. In brutes, in a state of nature, these impulses govern the movements, and sway all the actions of the living organism.

Before studying an antero-posterior vertical section of the skull, you should become acquainted with the general features of each of the bones of the skull, and of the parts of which they consist. This will be best accomplished by comparing the adult bones with the fœtal bones at birth. Take first the occipital bone. The fully-developed occipital bears a remarkable resemblance to a vertebra. It is placed immediately over the atlas with which it articulates, and is the medium by which the skull is supported on the spinal column, and the weight of the skull transmitted to it. It is perforated by this great aperture, the *foramen magnum*, which transmits the continuation of the spinal marrow, and corresponds with the foramen of the vertebræ. In front of the foramen is the part which corresponds with the *body* of the vertebra,—the *basilar process.* The margins of the *foramen magnum* constitute the *arch* composed of the *pedicles* and *laminæ.* The posterior expanded portions of the bone, or *squama occipitus*, may be regarded as an expansion of the *laminæ*, the *spinous process* being represented by this projection on the outer surface, called the *external occipital protuberance*, together with the ridge running down from it to the foramen magnum, or *external occipital crest.** Of the *articular process* only the *inferior* are present, and these are at once recognized in the convex eminences which flank the foramen magnum. Passing through the bone above the condyle on each side is a *foramen* called the *anterior condyloid*, which transmits the twelfth cranial nerve, or hypoglossal. Outside this part of the bone is a large notch, completed by the temporal bone into a foramen called the *foramen lacerum posticum basis cranii*, which transmits, in addition to large blood-vessels, the ninth, tenth, and eleventh pairs of cranial nerves. These foramina, the *anterior condyloid* and the *posterior lacerated foramen*, may together be taken to represent the inter-vertebral foramina of the spinal column. When the anterior condyloid foramen is present it pierces the boundary of the foramen magnum, but in fishes the hypoglossal nerve is absent, and then the bone is pierced by the nerves which, in man, pass through the large lacerated hole. In the child at birth we see that the occipital bone is in four distinct segments. The *basilar process* is a separate bone, and is called the *basi-occipital.* The part of the occipital which bounds the foramen magnum laterally, and is perforated by the condyloid foramen, is a separate bone on each side, and takes the name of *ex-occipital.* It bears on its under surface the main portion of the occipital condyle. The curved, expanded plate behind the foramen magnum, the *squama*, is termed the *supra-occipital*, so that the occipital bone consists of four pieces,—a body or *basi-occipital*, two *ex-occipitals*, and a *supra-occipital.* These terms should be remembered, and not only remembered, but generally employed in our anatomical text-books, because these segments are represented through the vertebrate series, and described under these designations. Human anatomy should be taught at our schools under three aspects,—a less important aspect, which looks towards comparative anatomy, and more important aspects, which look towards physiology and the practice of medicine and surgery. By looking at anatomical structures in relation to corresponding structures in lower animals we gain breadth of view, and open up sources for philosophical reflection, and, perhaps, scientific study hereafter; by looking at anatomy in relation to physiology we divest the study of anatomy of its dry technicalities, and exercise intelligence for the relief of memory; by looking at anatomy in relation to medicine and surgery we help to place the art of the medical practitioner on a firm and solid basis, and we prove the necessity for all—yes, and more than all—the devotion which medical students at present are required to give to the details of anatomy, which, without a practical bearing, would indeed be weary, stale, flat, and unprofitable. (*To be continued.*) —*Lectures on Human Anatomy, Descriptive and Surgical. By Walter Rivington, M.S., London, etc., Surgeon to the London Hospital, etc., in Medical Press and Circular.*

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* The supra-occipital is generally regarded as the expanded neural spine, and the ex-occipitals as the neural arches combining the pedicles and laminæ, the arch having to be completed by the neural spine. The point is of no great importance.

ON RANULA.—In a contribution (*Gazette Hebdomadaire*, No. 16, 1877) giving short clinical reports of six cases of ranula observed by himself, Prof. Michel, of Nancy, discusses the nature and situation and the surgical treatment of this form of new growth. In each of these cases excision of the cyst was practiced with complete success. From observations made during these six operations, and also from dissection of a ranula in a dead subject, the author has been convinced that in the majority of instances of this affection, the cyst in its development has no connection with any of the salivary ducts. The view that ranula may be due to dilatation of the ducts of the sublingual or submaxillary glands is not altogether rejected; but it is held that, in the majority of cases, the cyst has some other seat of origin. In all the seven specimens examined by the author there was an absence of any connection between the cyst and the salivary canals, and in each case the tumor had evidently originated in the areolæ of the connective tissue about the frænum of the tongue. The so-called capsule of Fleischmann, fluid distention of which is supposed by Tillaux and other French surgeons to constitute ranula, consists, according to Prof. Michel, in nothing more than an occasional and abnormal dilatation of one or more of the areolæ of the sublingual connective tissue. On microscopical examination of the contents of the cyst in the above-mentioned seven cases, tessellated epithelium and crystals of cholesterin were found in some, and globular epithelium in others. In no specimen was the author able to obtain a reaction resembling that produced by saliva. Prof. Michel holds that extirpation by the knife ought to be regarded as the general method of treatment for ranula; and he argues that this proceeding, first recommended by Heister, is free from many of the objections that have been raised against it by Sedillot. Far from being an impracticable operation in ordinary cases of ranula, it may, even in cases of severity and long duration, be readily and safely performed. Excision, though more difficult than the usual methods of surgical treatment, such as injection of iodine, batrachosioplasy, and incision and cauterization combined, is attended with speedy as well as with most permanent results. No relapse had occurred in any of the six cases treated by the author, five of which have been under his observation from time to time during many years. Two methods of extirpation are mentioned: in one, the ranula is first freely incised and the walls of the emptied cyst then dissected away; in the other, the cyst is removed intact, together with its contents. The choice between one and the other of these methods should be guided by the thickness of the cyst-walls. When this wall is thin, preliminary incision is to be preferred; when it is thick, extirpation without incision should be practiced.—*British and Foreign Medico-Chirurgical Review.*

Disease and Removal of the Upper Jaw.—Mr. H. K. E., a patient of Dr. E. F. Parsons, of Thompsonville, Conn., received a blow upon the left cheek from a sled-stake in February, 1875. Severe pain and some swelling followed, but passed away in the course of a week or ten days. Six months later there began a bloody discharge from the left nostril. Early in the spring of 1876 pain began about the spot where the blow had been received. The discharge from the nostril continued to be annoying. In September, 1876, the left cheek, over the antrum, began to swell. In November the pain grew worse; the discharge became more bloody and more copious; the swelling also was more prominent, and, in December, projected into the mouth below the antrum.

The antrum was punctured January 9th; a copious discharge of blood and unhealthy pus followed. Apparent improvement was the result for a month, the swelling remaining stationary, and the pain subsiding. It was not long, however, before the symptoms returned with increased severity, the pain causing much loss of sleep. The patient was now confined to the house.

On March 21st, 1877, the left superior maxillary and malar bones were removed by Dr. David P. Smith, of Springfield. The patient was placed in an armed rocking-chair and thoroughly etherized. An incision was made down to the bone, dividing first the lip, in the median line, up to the septum nasi, thence extending outwards under the left nostril, around the corner of the nose, and perpendicularly upwards to a point just below the floor of the orbit, thence outwards to the zygomatic arch.

The advantages of this incision over the old-fashioned one from the zygoma to the corner of the mouth were apparent, as the skin and fasciæ were dissected from the cheek and the whole flap was laid over downwards and out of the way. The bones were more thoroughly and easily exposed; and the operator was enabled to see his way clearly, and to finish the operation unembarrassed by an overhanging flap. The soft palate was left entire. Blood was easily removed from the mouth during the operation by rocking the patient forwards, and swabbing the mouth with a sponge. There was no troublesome hemorrhage. A few bleeding points, deep down, were touched with the hot iron. The wound was stitched, strips of sheet-lint being stuffed into the cheek to support the flap. No ether was given after the beginning of the cutting, but anæsthesia was complete during nearly the whole procedure.

The wound healed rapidly externally. The patient's health has gradually improved since. There is now, May 26th, a very slight discharge occasionally from the inner part of the excavation under the eye, with slight soreness and more or less discomfort about the wound. The general health is good, and the flesh is increasing. The patient eats all kinds of food, and is beginning to attend to business, out-doors and in, every day. The deformity is lessening. Articulation is somewhat impaired.

The mass removed was about the size of a turkey's egg, solid, somewhat tough and porous, and partly soft. There was no trace of true bone except in a small part of the superior maxillary including the last molar tooth.

The microscope showed fibrous tissue with numerous cells, small, round, oval, or caudate, having from one to three nuclei, also numerous fat-globules.—*Annual Report for Hampden District to Massachusetts Medical Society, in Boston Medical and Surgical Journal.*

Excision of Upper Maxilla for Malignant Epulis.—A man aged 36 had been sent up from the country with cancer of the alveolar processes. It formed a large mass, nearly filling the mouth. Partial removals had been previously effected, with but little benefit. The growth was first observed in October last year, and a fortnight ago Mr. Lawson removed it, using Fergusson's incision, running down the side of the nose and center of the upper lip. This portion of the face was dissected up as a flap; and then one-half the hard and soft palate, half the fauces, and the greater portion of the superior maxilla were removed,—leaving, however, the orbital plate intact. The ascending ramus of the lower jaw, being diseased, was snipped off. The man now gets up and is able to take food well. The wound in the skin is healed.—*Middlesex Hospital Reports, in British Medical Journal.*

Extraordinary Hypertrophy of the Lower Jaw.—Dr. Vittadini describes, in the *Annali Universali di Med. e di Chir.* for March, 1877, the case of a woman who, in her twenty-first year, suffered from diffuse submaxillary lymphadenitis, which after prolonged treatment disappeared, but resulted in a slight swelling of the submaxillary soft parts, the effect of which was to give to the lower margin of the lower jaw a puffed-out appearance to the extent of a deformity. Two years later she married, and, after two more, was confined of a healthy child. She only lived six months more, at the end of which she suffered from chronic metroperitonitis, for which she was admitted into the hospital of Castelnuovo Scrivia, where she died at the age of twenty-six.

The lower jaw was removed after death, and found to be greatly thickened, especially in the body of the bone, though the form was retained. It weighed nine and one-fourth ounces, or about double the normal. The various fossæ and foramina were obliterated, also the oblique lines; and the anterior surface projected to the level of the alveolar margin. The teeth were good, regular, and fourteen in number; the third molars being absent. A section was made, and the interior found of ivory consistence throughout. The nature of the enlargement is thus considered a simple hypertrophy, all acquired during the five or six years in which the patient suffered from submaxillary inflammation.—*London Medical Record.*

Pathology of Scurvy.—Mr. Charles Henry Ralfe, after a careful inquiry into the general pathology of scurvy, feels justified in drawing the following inferences:

1. That the primary change that occurs in scurvy is *a chemical alteration* in the quality of the blood.

2. That this chemical alteration, as far as can be judged from inferences drawn from the analysis of urine in patients suffering from scurvy, and analysis of "scorbutic" and "antiscorbutic" diets, points to a *diminution of the alkalinity of the blood.*

3. That this *diminution of alkalinity* is produced in the first instance (physiologically) by an increase of acid salts (chiefly urates) in the blood, and finally (pathologically) by the withdrawal of salts having an alkaline reaction (chiefly alkaline carbonates).

4. That this *diminution of the alkalinity* of the blood finally produces the same results in scurvy-patients as happens in animals when attempts are made to reduce the alkalinity of the body (either by injecting acids into the blood or feeding with acid salts),—namely, dissolution of the blood-corpuscles, ecchymosis, and blood-stains on mucous surfaces, and fatty degeneration of the muscles of the heart, the muscles generally, and the secreting cells of the liver and kidney. —*The Lancet.*

A Remarkable Deformity of the Teeth.—A Russian traveler, M. Miklucho-Maclay, during his travels in Melanesia observed among the natives of the Admiralty and Hermit Islands a remarkable peculiarity of the teeth of the upper jaw. The incisors project "shovel-like" almost horizontally, and to such an extent as to extend beyond the lips when the mouth is closed. The breadth of the teeth is so great as to equal their visible length, being as much as nineteen millimeters to sixteen millimeters of length, measured from the edge of the jaws. As all the teeth have a blackish polish, owing to the prevailing habit of betel-nut chewing, the mouth has anything but a pleasant appearance.—*Medical Press and Circular.*

Proposed Dental Diplomas in Ireland.—On Saturday afternoon a meeting of dentists representing the five northern counties of England was held in the Queen's Hotel, Leeds, for the purpose of assisting the dentists in Ireland to obtain a diploma from the Royal College of Surgeons of Ireland. Mr. J. S. Turner, M.R.C.S., of London, was called upon to preside. A report was presented from a committee appointed at Manchester, and the following resolutions were adopted: "1. That we hail with satisfaction the efforts that are being made by the dentists in Ireland to induce the council of the Royal College of Surgeons in Ireland to institute a dental diploma, and we pledge ourselves to give them our cordial support. 2. That this meeting has heard with satisfaction the statement of the committee appointed at the meeting of dentists held in Manchester on May 12th, and pledges itself to support the committee in the course which it has adopted."—*Medical Press and Circular.*

Alleged Poisonous Properties of Dental Vulcanite.—The interest excited by the publication of a statement by Dr. Bathurst Woodman, to the effect that he had met with several cases where patients had shown symptoms of mercurial poisoning (for which he could find no other explanation than that they were wearing artificial gums or palates covered with vermilion), led the Odontological Society to appoint a committee to collect evidence and report upon the subject. The committee has reported in the following terms:

1. So far as any action on man is concerned, vermilion is a harmless substance.

2. So far as any effect or influence of the vermilion is concerned, the mixture of vermilion, sulphur, and india-rubber, commonly termed "dental rubber," is also a perfectly innocuous substance.

3. Pink or red dental vulcanite, even when placed under the se-

verest conditions of experiment, does not yield any trace of mercury to saliva, or indeed to other far more powerful solvents.—*Medical Press and Circular.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

How can I reduce the thick congested condition of the soft parts one often finds when a badly-fitting plate is being worn, unless the patient will consent to discontinue the use of same?—I. H. A.

If M. M. J. will enlarge the canal below the point at which the instrument was broken off, and then use a very fine broach, wrapped with cotton, carrying the same up to the point at which the piece of instrument is lodged, then carefully rotating it, he will doubtless be successful in removing the fragment.—W.

If W. L. D. has not as yet found a mouth-wash to meet his expectations, let him try the following, which I have used for some years with very gratifying results:

℞.—Tinct. calendulæ (common marigold), f℥j;
Aquæ, f℥ij.
M.—Use six or eight times daily.

I make my own tincture by saturating the flowers in alcohol forty-eight hours. —Charles W. Slick.

If W. L. D. will use tincture of myrrh after extracting *teeth*, as a mouth-wash, three or four times daily, he will find it to heal and harden the gums more speedily than anything else.—H. H. Maxwell.

[The objection to the use of tincture of myrrh is that the dilution of the tincture occasions a precipitation of the gum about the necks of the teeth, and thus tends to produce a spongy condition of the gingival margins.—Editor Dental Cosmos.]

In answer to M. H. S., I would say that nothing will *wholly* prevent the reaccumulation of tartar after its removal, and all we can expect from a powder or mouth-wash is to keep the mouth in a clean and healthy state. If I were to give a formula for the best powder or wash, it would be something like the following:

℞.—Tooth-brush;
Aquæ;
Muscle.
M. Frank H. Brimmer, *Castine, Maine.*

Answer to A. T.—Heat the flask with dry heat, give it time for the rubber to get perfectly soft, then screw it together evenly and rapidly.

I do not experience any difficulty.—Geo. W. Williams, *Germantown, Pa.*

Answer to Dens.—We have to depend on the *weight* of the plate when little or no ridge is visible in the lower jaw; therefore *gold* should be the material used.—Geo. W. Williams, *Germantown, Pa.*

"COUNTRY" can find a complete answer to his question in an essay by Prof. H. Judd, on "Finishing Fillings," read before the Missouri State Dental Association, at Sedalia, June 6th, 1876; published in November No. of *Missouri Dental Journal* for 1876.—J. G. HARPER, D.D.S., *St. Louis.*

IN reply to the request of your correspondent, "Country," who desires to know the details of burnishing and polishing a filling, I will relate my own *modus operandi*, which is as follows:

After thoroughly condensing the gold I take a corundum-point, adapted to the size of the filling, and fit it to the dental engine. On putting this in motion in contact with the gold it will cut it (the gold) away very rapidly, leaving a smooth but unpolished surface. Continue this operation until every scratch is removed, and the gold, on closing the jaws, is found not to come in contact with the antagonizing tooth. Care must be observed to so shape the filling that the gold does not overlap the margins of the cavity but is just on a level with the enamel, thus preventing the lodgment of any foreign matter and constituting a self-cleansing surface.

After grinding the gold down to the proper proportions a beautiful polish may be given by means of properly-shaped points, made of hard sole-leather, charged with prepared chalk. These are fitted to the engine, as before described, and used in the same manner.

After polishing, the whole surface of the gold should be burnished with a burnisher and some lubricating substance, such as glycerine or soap; this will put on a polish which, if kept clean, will be permanent.

If "Country" is not provided with an engine, he will be compelled to perform the operation by means of files, etc., but this will never be so satisfactory, and will require a longer time and arduous labor. He will find it to his advantage to procure a dental engine, which will enable him to perform his operation with dispatch.—F. F. DREW, D.D.S., *Baltimore, Md.*

IN reply to the query of J. F. H., in the September number of the DENTAL COSMOS, respecting the case of abscess of the antrum under his charge, I have the following advice, based upon actual practice, to offer:

First, re-establish an opening from the mouth into the antrum by means of a drill or other sharp-pointed instrument. If the course of an old fistula or the socket of a previously-extracted molar tooth is followed, the operation is not difficult, and not dangerous, provided the instrument be not carried up too far.

Secondly, as the treatment must be by medicated injections, a proper syringe, with a suitable nozzle, must be obtained. The best for the purpose is the ordinary bulb-syringe, known as Davidson's, as this can be more readily manipulated by the patient himself, without the aid of an operator. To the end of the smaller pewter nozzle, which comes in the case with this syringe, should be fitted a slightly-curved, fine-pointed silver nozzle, such as is used by dentists. This fine-pointed nozzle can, with a little practice, be passed by the patient through the fistula directly into the antrum, thus bringing every portion of its lining membrane within reach of medicative agents. Of these I have found carbolic acid by far the best. It should be injected freely, and in such strength as can be borne without too much pain. Two drops of the deliquesced crystals to a fluidounce of tepid water will be found a very strong solution for the purpose, perhaps too strong for the early applications. I have found it very advantageous before each application of the carbolic acid to syringe the antrum freely with a solution of common salt, about as strong as ordinary sea-water. This seems to coagulate the albumen of the accumulated muco-purulent matter, which is thus more readily washed away, leaving a cleansed surface for the action of the carbolic acid.

These injections should be used three times daily, until a decided lessening in the amount, as well as the offensiveness, of the discharge is manifest; the frequency of the injections can then be diminished. The early-morning injection will, owing to the muco-purulent accumulations of the night, always be found the most necessary and the most satisfactory. The injections should not be abandoned because of the closure of the nasal orifice of the antrum. Such closure is quite frequent in the earlier stages of the treatment, and is due to the congestion of the mucous membrane produced by the unaccustomed presence of the remedial agents employed; by frequent repetition a greater degree of tolerance is usually soon obtained. If the closure of the nasal orifice is very persistent, lessen the strength of the injections.

If there is very extended necrosis of the walls of the antrum, this treatment can, of course, be regarded only as palliative; but even then it is none the less necessary and advantageous; it gives comfort to the patient by diminishing the offensiveness of his disease; it produces a healthier tone in the mucous membrane, and secondarily in all its associated tissues; and thus goes far towards arresting the progress of necrosis in the frail, bony fabric which goes to make up the osseous structure of the antrum.

Where the progress of necrosis has been arrested, unless it has already become too extended, I think that in the case of an ordinarily healthful subject we can hopefully look to the reparative powers of nature, either through exfoliation or absorption, to ultimately remove the necrosed bone, and thus cure the disease. The process is at best a slow one, often extending over years; but many severe cases of abscess of the antrum, proceeding primarily from alveolar abscess, have been permanently cured without other surgical interference than the extraction of the offending tooth or teeth; this, of course, followed by appropriate treatment.

In the case reported by J. F. H. no molar or bicuspid teeth now remain upon the affected side; and in a severe and prolonged case it will generally be found that at least all the molar teeth of the side involved must be sacrificed before a cure can be hoped for; the rapid absorption of the alveolus which ensues seems to promote the disintegration, exfoliation, or absorption—whatever or whichever the process may be—of the diseased bone.

In this disease a judicious regimen is all-important; debilitating habits or pursuits must be abandoned; healthful and nutritious food insisted upon. I attach great value to the free use of unbolted wheat or other grains properly cooked. Such food is rich in the phosphates; and they are perhaps not more essential in building bone than in repairing it.—W. F. L.

Pulp-Devitalization.—I have read with great pleasure and profit Prof. Flagg's instructions in regard to the treatment of exposed pulps. I have followed them in the treatment of bicuspids and molars, and have had no trouble since I read his communications on that subject. I have, however, pursued a different plan with incisors and canines. I simply make a perforation with a sharp drill in the neck of the tooth at the edge of the alveolus, completely severing the pulp and opening into the canal, which perforation I leave open under the gum. I then prepare the cavity and fill immediately.

I have filled hundreds in this way, and have never had any trouble with them subsequently. It requires only a minute to make the perforation, and a tooth so treated never discolors. I see no propriety in using arsenic in incisors or canines. —H. H. Maxwell.

Our attention was called a few days ago to an old cat, which was sitting in the doorway with her tongue hanging out of her mouth. We took hold of it and gave it a smart pull, but she neither moved her body nor tongue. We lifted her lip and found that she had her teeth pressed firmly against it. On examination we found that her—not canine but feline—tooth on the left side was loose and necrosed, and gave her pain on the slightest touch. The outside of her jaw presented the same appearance as that of a human being suffering with an abscessed tooth. We took her to the office, made our assistant hold her feet, when we extracted it; and when we released her, strange to say, instead of running from us she seemed, from her actions, to thank us for the relief given by remaining where we were and rubbing up against us.—Wm. A. Mills, D.D.S.

We think the young lady's case spoken of by Dr. F. F. Drew in September number of the Dental Cosmos was not a coincidence, but a positive case of *nervo-sympathetic action.* We have had similar cases in our own practice. One case in particular was that of a United States soldier, stationed at this city, who had been treated by the station-surgeon for nearly three weeks for ulcerated sore throat, ulceration of the left ear, and what was supposed to be rheumatic pains in the shoulder, extending as far down as the fore-arm. He had almost begun to despair of having any relief when he discovered that one of his molar teeth ached. On applying to us we discovered a terribly-diseased tooth, produced by the crowding of the wisdom-tooth against it. We extracted the tooth, and in two days following he had totally recovered, all the affected parts having regained their normal condition.—Wm. A. Mills, D.D.S.

Epulic Tumor, situated upon the labial surface of the superior maxillary ridge, opposite the root of the right cuspidata. Patient, a gentleman about sixty years of age. Said he had had it taken off twice before, and it had returned immediately both times. I took it off, with all the flesh I could remove from the bone, scraping the bone with a round-pointed knife. I then saturated a small roll of cotton with a weak solution of carbolic acid, and had him hold it over the place, with his lip, until the next day.

This was three years ago, and there is no sign of a return of the tumor yet.—J. C. Brooks.

Shedding of Hair and Teeth.—We transfer the following query from the pages of the *British Medical Journal.* The writer of it is not the only one who would like to know how to prevent the shedding of hair and teeth.—Editor of Dental Cosmos.

"Sir,—I should feel grateful to any of my brethren who would inform me of a reliable mode of treatment for arresting (*a*) the shedding of the hair of the head; (*b*) the same of the teeth. I have a patient, a lady in good health in every respect, who, about two and a half years since, found her front, large, fine and perfectly sound teeth loosening, and eventually coming out. The gums are now uneven, and look as though they had receded from her teeth. As to her hair, it has begun to get thin every September, becoming thick again towards Christmas; but this year it commenced to 'thin' last April, and still continues to come out. I am, sir, yours truly, Master in Surgery."

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to Act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 510.)

WITH *inferior central* and *lateral incisors*, and with *inferior cuspids*, it is usually the best practice to enter the canals through the cavities of decay, enlarging them sufficiently for this purpose when such increase of size is desirable; but the *inferior incisors* are occasionally (like the superior incisors) found to contain devitalized pulps (chiefly the result of blows) without any concomitant caries,—the best position for tapping these is upon the *lingual face, just posterior to the cutting edge.*

The roots and canals of the *inferior centrals* are small, thin, and flattened, though, as a rule, accessible and easily entered when fairly tapped.

The roots and canals of the *inferior laterals* are larger, thicker, and less flattened than those of the centrals; these are generally easier teeth upon which to perform the operation of pulp-extirpation than are the inferior centrals; in this they are opposed to the conditions existing in connection with superior incisors, in which the centrals are far easier teeth to operate upon than are the laterals.

Inferior laterals are to be tapped (when tapping is indicated) upon the *lingual face, just posterior to the cutting edge.*

If no cavity of decay exists in a case of devitalized pulp, pertaining to an *inferior cuspid*, a sufficiently good ingress to the canal is afforded by tapping the tooth at the *disto-labial portion, near the edge of the gum.* The root is large, the canal easy of entrance, and the pulp easy to extirpate.

Ingress to the canal is not so direct as it would be if the tooth were tapped fairly upon the labial face, or, better yet, upon the mesio-labial aspect, but by tapping as suggested, a sufficiently good entrance is effected in a *less conspicuous* position.

The roots and canals of *inferior bicuspids* (both first and second) are large, cylindrical, and easy of entrance.

If the cavity of decay is upon the mesial or buccal face of the tooth, good ingress is afforded; but it is only infrequently that I attempt extirpation of the pulp from the distal face of an inferior bicuspid.

If a distal cavity be very large, impinging notably upon the disto-buccal angle, it is then questionable as to whether a further weakening of the tooth by drilling a tap-hole is advisable; but if the cavity be fairly upon the distal face, or again, if it present disto-lingually, I think it unquestionably preferable that it should be filled at once, and all subsequent pulp-treatment be conducted through a tap made upon the *buccal face* (rather mesially), and *drilled slantingly downward* towards the root portion of the pulp-cavity.

By this inclination a more direct entrance into the canal proper is effected, and the bulbous portion of the pulp-cavity is easily entered by means of a rose drill.

The *inferior first molar* is well entered from the *buccal* face, also from a *large* cavity of decay upon the *articulating* face, and reasonably well from a *large* cavity of decay upon the *mesial* face; but an extirpation should never be attempted from a cavity of decay upon the distal face, nor even from one which *somewhat* impinges upon the articulating face.

From this position it is simply impossible to obtain anything like a thorough removal of pulp-structure from the mesial canal; and this is rendered less likely when, as is very frequently the case, a marked division of the mesial canal into *two* exists.

This division of the mesial canal cannot strictly be termed a bifurcation, as it is a more or less decided formation of two distinct canals, the mouths of which enter equally into the bulbous portion of the pulp-cavity.

This result is obtained from a variable degree of constriction of the middle of an open oval canal, giving to its mouth an hour-glass shape.

It is usual that an open connection, though very thin, exists between these, practically, two canals, for at least a certain portion of their length, though sometimes the division is absolute throughout the entire length of the root.

The distal root more generally contains a single large canal, very easy of access, and from which the pulp is extirpated without difficulty. This is, however, sometimes a flattened and constricted canal, and is, infrequently, as decidedly divided as is the mesial canal.

It is therefore prudent always to search for *four* canals in a lower first molar.

When the cavity of decay in a lower molar is only average in size and is located upon any other face except the *buccal*, my usual practice is to fill it and tap the tooth upon the buccal face.

By reference to the positions in which decay is liable to occur, it will be found that the *buccal sulcus* of lower molars is stated to be *frequently* attacked.

It is therefore desirable that the *center* of the tap-hole should be so located that this sulcus shall be included within the diameter of the tap. It should also be sufficiently distant from the free edge of the gum to preclude the wounding of that tissue during the enlarging of the orifice. It should be centered decidedly mesio-buccally, that the finished tap may be *mesio-buccal.* This should be particularly the case when the decay is upon the distal face of the tooth, as by so drilling the disto-buccal enamel is less weakened.

Unlike the superior second molar, the *inferior second molar* is very like the inferior first molar.

All directions pertaining to inferior first molars may be regarded as pertinent to inferior second molars, and the remarks which I shall now make regarding the advisability of tapping these teeth may be received as applicable to all inferior molars, but more especially the first and second.

From various considerations, which will be given at length in connection with periodontitis and alveolar abscess, the lower teeth are somewhat more difficult of long-continued conservation after pulp-extirpation, than are the upper teeth.

The denser character of the osseous structure by which they are surrounded; the unfavorable action of gravitation upon all irritants and products of both acute and chronic inflammation; the greater danger of external complications, as permanent indurations, fistulæ, and scars, all add probable future complications which are sedulously to be guarded against by every possible precautionary measure.

It will be found, as we advance, that the value of the life of the pulp is increasingly recognized, and that so far from securing to the patient that immunity from suffering which is popularly believed to result from "killing the nerve," just the reverse is the almost positive sequence.

It has been decided that a pulpless tooth is far better than no tooth; but it is equally decided that sooner or later, subject to a variety of contingencies, trouble will *probably* develop, and it behooves every practitioner to so act as will best provide against the occurrence of this probable evil.

For this reason, and for the reason that inferior bicuspids and inferior molars are peculiarly prone to exemplify this probability, and that with every recurrence of trouble the difficulty of re-establishing the condition of tolerance of these teeth is greatly increased, I would advise the *habitual* drilling of tap-holes in them above all others.

The *inferior third molars*, or *lower wisdom-teeth*, are probably those from which the pulps are extirpated with the least satisfaction, and with the least hope of long-continued *consecutive* exemption from future trouble.

That these teeth do sometimes have comparatively straight roots and canals, such as admit of easy and complete pulp-extirpation, is undoubtedly true, but far more frequently the roots are curved very markedly backward. sometimes so much so as to present the seeming anomaly of having their apices turned upward almost as directly as the articulating faces of their crowns.

It will be readily recognized that it would be for the most part impossible to extirpate perfectly the pulps from any such canals, unless it might be in exceptional instances, by permitting sufficient time to elapse after devitalization to secure a complete sloughing of the pulp.

In the treatment of very important cases of this kind, as, for instance, when the third molar is the only one left for mastication on its side of the mouth, I frequently fill temporarily after pulp-devitalization, and allow two, three, or more months to pass (if no uneasiness is manifested about the tooth), and then remove the filling (gutta-percha) and gently essay the withdrawal of the pulp *entire*.

If I am successful I rejoice, but if I am not so, I replace the temporary filling and wait again for another month or more.

Should any soreness of the tooth, *such as would be indicative of irritation from pulp-putrescence*, supervene, the patient should be directed to return promptly, and the filling should be removed at once.

I have mentioned that pulp-extirpation from lower molars *may* be performed from *large* cavities upon the articulating faces, but I desire to call particular attention to one point which is very generally overlooked in the effort to enter the pulp-cavity from this position.

Drilling and excavating is usually done *much too vertically*. It should be noticed that the lower molars incline *inwardly* very decidedly, and it should therefore be recognized that drills should be pointed *outwardly* in order to remove that portion of dentine which fairly covers the mouths of the canals.

The number of lower molars which I have re-treated is very great (many hundreds), and I have frequently found *one*, and sometimes *two* canals *untouched*, when the effort to reach them had been made vertically through the articulating face.

The removal of the filling and the wider opening, cheekward, of the cavity would promptly disclose these hitherto uncovered mouths of canals, when the cleansing from *débris*, and the consequent comfort, would be an easy task and a satisfactory result.

The buccal tap-hole in first and second lower molars, and the mesio-buccal tap in lower wisdom-teeth, are very good guarantees against such oversights as these.

EXTIRPATING THE DENTAL PULP.

The tap-hole in any given tooth having been satisfactorily drilled and enlarged to the desired dimensions (large enough for easy thoroughness), the drillings should be gently removed by means of hooked probes and syringing.

It is better, even now, that water, slightly tepid, should be used, both from the fact that it may possibly yet be more agreeable, and for the purpose of establishing the *habit* of the invariable jet of *not cold* water in the mouth.

In practice, my only deviation from this is when I desire to use *cold* water as one means for making a diagnosis.

The bulbous portion of the pulp, if any now exist, should be probed gently to ascertain positively if any sensation still remain; if so, how much, and where.

Moderate degree of sensibility will be promptly and *comfortably* obtunded by puncturing in a liberal portion of the paste of carbolic acid and acetate of morphia or oil of cloves and acetate of morphia.

I wish now to enter a strong protest against any continuance of operating, if such continuance occasion a disagreeable degree of suffering.

It is time gained, confidence gained, credit gained, and patients gained, to stop at once and make a *second arsenical application*, nicely punctured into the remains of pulp,—not needlessly deep, nor with needless infliction, but sufficiently deep and with gentleness; or, if the tooth be a *lower* one, and the sensation is not great until a *decided depth* into the canal has been reached, I think the safer practice is to depend for final devitalization upon creasote (for those who use it), carbolic acid, or acetate of morphia paste, passed as thoroughly into the pulp-tissue as is possible without infliction of pain.

I must here dissent from the practice of leaving portions of vital pulp in canals, with what I regard as a visionary hope for the maintenance of a healthy and *necessarily* recuperative amount of vitality.

If such portions of pulp are bathed to saturation in creasote, strong tincture of iodine, oily carbolic acid, deliquesced chloride of zinc, or any such powerful escharotic, sorbefacient, or antiseptic medicaments, I can readily conclude that a result will be produced which will preclude much likelihood of any immediate future trouble; but that this exemption from trouble will be *due* to the *conservation of the vitality* of this remaining filament I gravely doubt.

My experience in such cases, both in my own experimentation and in following the experimentation of many others, is, that where vitality is conserved, a far greater amount of paroxysmal neuralgic suffering to patients, than would have been likely to have resulted from twenty times as much pulp-devitalization, is no infrequent result, while if immunity from suffering ensues, *time*, sooner or later, reveals the fact that this "treacherous quiet" has been due to the gradual but painless *death* of the "conserved filament."

When by renewal of applications and the allotment of due time for their operation, devitalization of a pulp has been properly accomplished, all further apprehensions in connection with the subsequent treatment of the tooth may be laid aside.

It is a very frequent remark from patients, that they have "had one nerve killed, and that the picking at it *after it was dead* (!) was torture enough for one lifetime." I regard such practice as reprehensible in the extreme, and I have now *such records* of the practice I advocate as are sufficiently *extensive* (as to number), *extended* (in time), and *satisfactory* to warrant a firm advocacy of it.

It is a matter of but little moment that canal filaments of pulp should be taken away *entire;* on the contrary, these are usually more easily and quite as effectually removed by being broken up by finely-hooked, barbed, or even square, smooth probes, and then taken away in pieces and syringed out of the pulp-cavity.

Where canals are of a size to admit of the introduction of a filament of nicely "taper twisted" cotton-wool, wet with carbolic acid or oil of cloves, alongside of the remains of the pulp, a very clean extirpation may be made by twirling the cotton with a broach and thus entangling the *débris* and withdrawing both together.

When canals are too fine to admit of other manipulation than broaching, this should be carefully, patiently, and persistently prosecuted until by *educated touch* a cleanliness of the parts is assured. As each canal is prepared thoroughly (or as thoroughly as possible) it should be filled with oil of cloves (pure), or with the saturated solution of salicylic acid in oil of cloves (acid. salicyl., ℈j; ol. caryoph., f℥j).

This is done by putting a drop or two in the pulp-cavity and passing it into the cleansed canal by means of a fine probe, after which the superfluous oil should be removed with bibulous paper, and a tapering dressing of cotton-wool, *not large enough to fill the canal to its mouth*, should be carefully and neatly introduced.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.—SEVENTEENTH ANNUAL SESSION.

SECOND DAY.—*Morning Session.*

THE meeting was called to order at the usual time. The treasurer's report was read, showing an expenditure of $601, for all purposes during the year, and a balance on hand of $288.

Dr. Dean read a letter of regret from Dr. Winder, of Baltimore, who was unable to be present on account of detention by military duty.

The paper of Dr. Farrar on "North Light *vs.* Sunlight" was then read by the secretary.

It consisted of a somewhat lengthy discussion of the question whether it was better for the health of the dental operator, to work by a northern exposure, or at a south window. The writer claimed to speak, from personal experience, of the advantages and disadvantages of both kinds of light, and his object was to show that the policy of working all day in a north light was not only unhealthy, but that that light is no better, if as good, as sunlight, for dental work.

The essayist spoke of the influence of sunlight upon life, which he said was something unfathomable. That there are dentists who work in the north light who, by reason of iron constitutions, can resist its influence he did not doubt, but, as a rule, they are not constant workers. Sunlight suggests health and cheerfulness. The ruddy urchin who has the sunlight contrasts strongly with the sickly child of fashion. The paper quoted at some length from Sir David Brewster and others to show the beneficial influences of sunlight. This author says, "Sunlight is the very life-blood of nature." "Where light does not enter, the physician will have to go," is an old Italian proverb.

Dentists argue that because the north light is more steady it must be best, which is to imply that artificial appliances about the window are of no use.

The sun has always been considered as having more or less influence in the regulation of animal and vegetable functions, both in health and disease. People who pursue their calling where the sun is shut out suffer by it. The ruddy face of the out-door laborer is markedly in contrast to that of the underground operator. Statistics show that hospital patients who live in north rooms do not progress as well as those who have the sunlight. The blood degenerates and becomes watery, the tissues flabby, and the vital energies prostrate. Why this is so is not understood, but it is a fact. Yet how often do dentists with a tendency to phthisis pulmonalis continue to worship the old idol, "north light"! Pure air, exercise, and rest, though matters of prime importance, are nothing without the influences of the solar rays.

The paper then quoted from Dr. Willard Parker and others to show the influence of sunlight upon diseases. The different functions of the chemical and heat rays were spoken of, and their varying intensity at different seasons and in different localities was also noticed. The United States enjoys a very steady condition of the sun's rays, and no people are so intelligent and energetic as ours. Further quotations from Drs. Willard and Draper were made to illustrate the value of sunlight. None of the physiological effects of sunlight can be produced by artificial light. The trees in the forest, and the potato in the cellar, both seek the light. The greatest mortality is found among people who inhabit secluded and dark quarters. Statistics in regard to those who live in caves were referred to, showing that they either do not live long or are stunted in growth, though this seclusion is, of course, not the sole cause of this result.

The writer then attempted to show that many dentists have died and are now dying from pulmonary and scorbutic diseases, who might probably have lived much longer had they lived more in sunshine. Rheumatism and neuralgia are often caused by shade. Florence Nightingale was quoted from to show the effect of sunlight upon the sick, as were also other authorities. The experience of Dr. Kane was then referred to, whose men, during the long polar night, showed an increasing tendency to disease, as well as a more waxy and sunken countenance, all of which was changed by the rising of the sun.

The experiments of Dr. Edwards upon tadpoles were described. Frog-spawn in dark boxes failed to develop, while those in the light did so in their regular time.

The claims of northern light were then discussed, and the writer concluded that, although it might be steadier, it was as much colder in winter as it was cooler in summer. There is no such thing as steady daylight. It is only relative. On a bright day a north light may be good, but on dark days it is insufficient, and for some operations it is so even when strongest. The author claimed that he could do much finer work with less fatigue to the eyes by the south light than by the north. It was claimed that while the operatives in watch-factories prefer the northern light, yet they want a strong light upon the point of work. The writer then detailed his own personal experience in working by north and south lights. In 1873 he built a bay-window upon the north side of his office. He entered it in a high degree of health, but after being closely confined for a year he found himself growing weak and pale, a condition which steadily increased until his friends believed him suffering from phthisis. In about a year he was troubled with an affection of the eyes. He then built another bay-window on the south side of the house with proper arrangements for regulating the light, which he allowed to shine directly upon himself and his work. Under the same amount of work he found himself recovering, his complexion became ruddy and his vision strong. Working afterwards in a western light, which was cut off by tall houses during the winter, he experienced a recurrence of both the troubles, which, when spring approached and the sun again shone in, once more disappeared. His experience had satisfied him that the sun is necessary to health, cheerfulness, and strength, and if he could conveniently do so he would have his operating-room in a sky-light observatory, or (more practically) in a bay-window projected from the southwest corner of a block of buildings.

The subject being open for discussion, Dr. McQuillen said that the paper was exhaustive and able. Twenty-four years ago he had taken ground in favor of a northern light. Dr. Townsend had then told him that that doctrine would do for young men, but the time would come when he would want the southern light, and he had found it so. It is important to dentists to get a sun-bath; they should walk on the sunny side of the streets. Ladies and others are very apt to seek shade, which is no doubt deleterious. Our profession should walk in the sun in all seasons, except at mid-day in summer. At the seaside he (the speaker) lies in the sunlight, and rides on the sunny side of the cars at all seasons. He indorses the paper thoroughly.

Dr. Spalding, of St. Louis, would add his commendations as to the general character and substance of the paper. In the experiments of Edwards with tadpoles, which had been mentioned in the paper, one experiment had been omitted, viz.: that some of the tadpoles which were excluded from the light, though they grew to a large size, did not develop into frogs; but when fed on grass, which contains chlorophyll, a substance formed only in the direct rays of the sun, they developed into frogs, though remaining in the dark. He believed that the food of dentists might have an influence in counteracting the bad effects of exclusion from the sun's rays. Green vegetables should be used largely. He operates by a north light, but tries to overcome any deleterious influence by selection of food.

Dr. Waters, of Boston, has had a similar experience to that of Dr. Spalding. He operates by a north light, but finds that fruit is a benefit to him. He likes things that are grown in sunlight.

Dr. Rehwinkel said he could see that it would be an advantage to dentists if the paper of Dr. Farrar was printed and distributed to patients. People, especially American ladies, exclude the light from their houses. This is not quite so noticeable as formerly. He had always operated by a north light. A friend of his who operated by a south light liked it full as well. It is more strong and cheerful, and, when once we get used to it, is easily arranged. The arguments of the paper cannot be controverted.

Dr. Thomas, of Detroit. The paper is exhaustive, but it is a mistake that a northern exposure is cooler in summer. The breezes are always from the south. He heartily commends operating by a southern light. For eight years he operated by a south light; he now has arranged his office in the northeast corner of the building, and is sorry for it. He did not know what a blessing the sunlight was until he had experienced two years of northeast light. By all means secure south light.

Dr. Barker said he had objections to the paper. The question is not as to what the action of light on an invalid is; not whether Florence Nightingale found patients convalescent under a south light; it is whether you and I should operate by a north or a south light. The paper is in error about people of out-door employments living the longest. It is proved that that is the class that fill our asylums, and that merchants and people that have good food are the healthiest. He has worked twenty years by a north light, and as hard as any one, and is not willing to admit its injurious effects. Those who vary their work will injure their sight if they do not have a north light, while those who perform merely mechanical operations, which do not require any thought, may work by any light. Artists invariably prefer a northern light.

Dr. Kulp, of Iowa. Theory is worth more than practice. He thought formerly that he could only operate by a north light; had changed to an east light, and did not like it; has now moved to a southern light, and since doing so has thrown aside spectacles, to which he had sometimes been obliged to resort; thinks the south light cured his eyes. He has a stand of plants on which to rest his eyes when he is resting; believes from experience that a modified south light is the proper one for the dentist.

Dr. Palmer, of Wisconsin. As he values his life he would not dispense with a south light; would not dare to keep out of the sunlight. He had been obliged to give up business ten years ago on account of his health, and on beginning practice again was compelled to quit after working three months by a north light; but by taking a room with a south light he had been enabled to continue since. He believed the blue-glass theory had been of benefit in causing people to open their houses and let in the sunlight.

Dr. A. W. Freeman, of Chicago, said that he worked for seven years by a north light, during which time he was pale and sickly; he changed to a south window, and at first thought his eyes would give out, but after he had become accustomed to the light he would not go back to any other. Such a man as Dr. Barker could stand anything; he could eat sole leather and not feel it. Any man inclined to pulmonary troubles had better avoid a north light.

Dr. Atkinson. Those who detail experiences do not always digest them and get out the instruction that is in them. The paper overlooked the fact that light is light, and that it differs only in modes or forms. When we have learned that certain forms of light modify motions, we learn why different constitutions require different amounts of light. The virtue of chlorophyllin does not consist in its green color; celery is chlorophyllin minus the coloring matter. It does not make much difference how you get the sunlight within you. The direct rays of the sun never come into the eye except when looking at the sun. We seem to think that our individual experience is the standard of all experiences. My only objection to Dr. Farrar's paper is that he takes his stand-point as the only one. There have been more eyes injured by using too much light to see fine objects than by using too little. Truth does not ask to be bolstered up by half-truths; all she asks is to be announced in understandable form. Voluminous quotations of authorities do not settle truths. Let us forget these embryonal babblings and come up to the comprehension of principles, and let details go by.

Dr. R. R. Freeman. We all recognize the fact that sunlight is necessary to health, but the question is, Which light is best to operate by? During two years' operating by a northern exposure he operated pleasantly at all times. For five years he had operated by a southern exposure, where he had had a flood of sunlight, and found that he operated with less satisfaction to himself; the reflection upon the eyes from the gold is painful; the hand obstructs the light. If the curtains are adjusted rightly he can operate successfully for a short time, but the flitting of the clouds causes an injurious fluctuation. There does not seem to be a proper diffusion of light. We should not operate all day long in the shade, but we should have a light that is not flitting or glaring, but a pleasant modified northern light.

Dr. Noyes, of Chicago, said that he worked a year and a half in a northern light, but did not get enough. He changed to a south light, but on changing back to a north light with large windows he could do better than ever before. A highly-illuminated room is better than a concentrated direct light.

Dr. Judd. The compilation of the paper as to the effects of light in restoring health does not throw light upon this subject for the first time. These views have been urged for years by the medical profession. Nearly all the experiments mentioned in the paper were made by medical men. It does not follow that it is necessary to be in the sunlight all the time; we have no statistics that will justify that doctrine. Our business is to find out what amount of light is necessary. Certain eyes are better calculated to operate by a north light than by a southern. After trying a south light he had to return to a northern one. Each one must settle this question for himself.

Dr. McQuillen. That which will benefit an invalid cannot fail to benefit those that are well. The great advance in medicine of late years has been in the recognition of hygienic laws. Prof. Barker would not wish any one to infer that exposure to the sun is the reason of the insanity of farmers. That is due to the fact that they are isolated from society, and have a fixed routine of labor. After an experience of twenty-five years with a northern light, which he still used, is convinced that there is much in favor of a southern light.

Dr. Barker said that while he did not say that sunlight was the reason of the insanity of farmers, he did contend that it is one of the reasons. The paper makes an error in referring at such length to occupations which deprive the people of sunlight, and to the mortality among the poor. These things have no reference to us. The mortality among the poor is owing to other causes, such as want of proper food, clothing, etc. We must judge by our own experience.

The subject was then passed, and on motion of Dr. Spalding the session adjourned to visit the Board of Trade, which had through its officers tendered the association an invitation to do so.

Afternoon Session.

The meeting was called to order at the usual time. Miscellaneous business being in order, Dr. Rehwinkel called attention to Dr. Adolph Petermann's almanac of dentists in the German Empire,—a publication which contained in addition other useful compilations, such as the population of cities, lists of graduates of dental colleges, etc., and which would be very useful in detecting those who falsely pretended to be graduates of American dental colleges, thus affording means of putting a stop to the traffic in bogus diplomas.

Dr. Rehwinkel moved that, in recognition of the labors attending the preparation of this almanac, Dr. Adolph Petermann, of Frankfort-on-the-Main, and Dr. George Von Langsdorf, of Freiburg, Baden, be elected honorary members of the association, which motion was carried.

A congratulatory telegram from the Fourth District Dental Society of New York, in session at Saratoga, was received, and the president and secretary were instructed to answer the same, which they did.

The subject of Pathology and Surgery was called, and Dr. Rehwinkel, chairman of the committee, read a report, of which we give a synopsis, as follows:

The paper of Dr. Rehwinkel was entitled "Pyorrhœa Alveolaris," and consisted of an inquiry into the causes and treatment of that formidable class of diseases of the gums which are difficult to classify. Some claim that they are caused by a chronic inflammation of the root-membrane, aggravated by constitutional causes; while others think they are entirely local, having their origin in foreign deposits. Between these two theories it is almost impossible to draw the line. The writer quoted from Albrecht, a medical writer of Berlin, who describes the disease as consisting of a purulent suppuration of the gums; and he ascribes the cause to want of cleanliness, mercurialization, suppression of habitual secretions, etc. He claims that though in many cases it may be purely local, yet in the majority it is dependent upon constitutional conditions. The progress of the disease is more or less rapid; sometimes it is arrested entirely, while at other times it causes the loss of all the teeth, after which the symptoms usually disappear, indicating that the teeth are the sole cause of the disease.

Wedl also classes the disease among inflammatory affections, and corroborates the views of the above author. Salter treats of the disease under the name of "false scurvy;" he admits that the causes are neither constant nor intelligible. The opinions of other European writers were then referred to. Most of them seem to regard constitutional causes as underlying the disease, while American authors represent it invariably as a sequence of local causes, and chiefly due to salivary calculus. Credit has been given to Dr. Riggs, of Hartford, for bringing forward some special features of the disease, particularly as caused by salivary calculus. The views of Dr. Riggs, as given by Dr. Mills in an article in the DENTAL COSMOS, were alluded to.

The writer of the report (Dr. Rehwinkel) undertook to establish the doctrine that pyorrhœa may and does exist independently of foreign deposits, and in the cleanest of mouths. As proof of this, the case of Dr. Mills himself was referred to, as was also an epidemic which appeared at St. Gall, Switzerland, in 1876, in which the gums became inflamed, swollen, and spongy; the disease resisted all treatment, and prevailed until autumn in spite of the most vigorous means. In one instance the gums became inflamed under a plate of artificial teeth. The teeth usually dropped out. Investigation showed that the secreted matter abounded in parasites,—leptothrix, bacteria, etc. No pus-corpuscles were found. Herr Schlenker, who studied these cases, concluded that the presence of these parasites was the cause of the inflammation of the root-membrane. The application of salicylic acid produced no favorable effects. An alcoholic solution of thymol freely applied proved the best remedy, and, after applying it freely with a camel's-hair pencil, teeth which had become very loose were reported cured in a few days.

In the case of a young lady, aged eighteen,—otherwise healthy and with no accumulation of tartar,—the teeth had become very loose. The cause was suspected to lie in the fact that the menses had never been established. The extraction of two or three teeth, although very loose, produced violent and persistent hemorrhage. Local treatment and hygienic measures checked the disease, and when, after some months, menstruation was established, the disease disappeared and the remaining teeth became firm.

The writer thought that the origin of the disease could often be traced to the action of mercury, and that in other cases constitutional and inherited predisposition was manifestly the cause, and cited cases occurring under his own observation in proof of this doctrine.

Certain phenomena of the disease were noticed, such as the facts that the best teeth seem to be those most usually attacked, and that the free use of salt is often concomitant with the disease. To the explanation of these and other mysterious phenomena connected with the disease individual effort is insufficient. If statistics could be collected from different parts of the world they would be valuable, particularly if the profession of England, Ireland, and Scotland, and Continental European countries, were induced to collect them.

The subject of "Riggs's disease" was touched upon. The writer stated that he had recently addressed Dr. Riggs, asking for some account of his views, but had failed to receive any response. No printed reports or statements of Dr. Riggs's were to be found; but from the statements of his friends it is inferred that he claims that there is necrosis of the alveolar borders, and that excision of the necrosed portion down to healthy tissue is the only radical cure. It would be well if Dr. Riggs could be induced to make a statement of his views through the journals.

The subject being open for discussion, Dr. Rawls, of Lexington, Ky., said that he felt an interest in this class of cases. He thought, however, that the disease could only be checked for a while, and that it descended from generation to generation. Even when the foreign material and the necrosed bone which Dr. Riggs contends is present is removed, the relief is only temporary; but he does not believe there is any necrosis. Dr. Riggs has taken the honor of this thing to himself without any merit. He did not desire to reflect on Dr. Riggs, but he was sorry that he had put himself on record in this way.

Dr. Atkinson asked how and where Dr. Riggs had put himself on record as having called the disease "Riggs's disease."

Dr. Rawls. Dr. Riggs has said that for want of a better name he would call the disease Riggs's disease. He (the speaker) believed that salt had a tendency to aggravate the disease. A different disease attacks the teeth of the Irish and Scotch. This can be cured by a change of diet. While at home their teeth are good, but here, where they subsist on a salt diet, they become poor. He wishes that something could be done, but so far the object is not accomplished. In one family, of over one hundred and fifty members, every one shows the effects of the disease; and all of these people take good care of their teeth.

Dr. Shepard asked how the process can be gone if there is no necrosis.

Dr. Rawls. Dr. Riggs claims that there is a division between the healthy and dead tissue; thinks there is a gradual breaking down of the bony tissue. He has not been able to learn the cause of the disease; he thinks it is due to pyæmia or septicæmia.

Dr. Judd inquired what Riggs meant by necrosis.

Dr. Rawls said he did not know, except that he supposed he used the word in the ordinary sense,—meaning the death of the part.

Dr. Shepard said, there has been so much misrepresentation of this matter, founded on hearsay, that he cannot sit still longer. He does not believe that Dr. Riggs ever called the disease Riggs's; he had never seen that Dr. Riggs had placed himself on record in this manner; and though he had met him at various times for fifteen years, he had never heard him claim the name or discovery of the disease. The name is due to his disciples, who have given it that name for want of a better. We must lay aside the egotism that makes a man think he understands the disease, and has treated it in the best manner. Apart from that of Dr. Riggs, he has never seen successful treatment of the disease by any dentist in the land; it never has been treated to a radical cure except by Riggs, who knows something about the disease practically and pathologically. He will not, however, put in writing his own thoughts. He regards the disease as complex, as constitutional in origin, and decidedly so as to results, even to the carrying of the sufferer to the grave. In one instance the pillow had been moistened with blood and pus every night, which was swallowed during the day; the countenance was pale, and the patient emaciated; after treatment by celebrated pathologists had failed, he was entirely restored to health by the removal of the dead matter by Dr. Riggs, and is now a well man. The fact that the surgical treatment cures is proof that the disease is local in cause. All the symptoms, such as soreness and looseness of the tooth, subside after the surgical treatment. He has seen any number of witnesses to the cure of the disease. He is only speaking of what is termed Riggs's disease. He has seen hereditary cases. Constitutional causes may be at work, but the surgical operation effects the cure. The name, speaking accurately, should be Riggs's *treatment*, he being the first man to investigate and treat the disease; he is also entitled to the credit of constructing the proper instruments; and these are the reasons why we, who have been familiar with the matter, have called it Riggs's disease.

Dr. Riggs's pathology and explanation of the disease is this: at a variable age there is found a little deposit at the necks of the teeth, in cases where there is a tendency to the disease; it may be found in either jaw. He (the speaker) does not know the difference between this deposit and ordinary tartar, except that it is harder, and is found where ordinary tartar is not. There is an irritated and inflamed condition of the mucous membrane. In the first stage there is no absorption and no inflammation. There is further impingement upon the membrane till the process is reached, and there is then absorption of the thin wall at the edge of the alveolar process. If treated at this stage there is no recurrence of the disease.

In the second stage there is pus present, and the absorption of the process goes on for say ten years. In the third stage there is inflammation, with frequent discharges of pus and blood, looseness of the teeth, swaying of the process, and a trough formed by absorption. Then constitutional disturbances occur; eruptions take place on the breast. On removal of the deposit health and comfort ensue. There is an infallible rule by which to tell whether the operation is a success or not: if in a month's time, pressure causes any pus to exude, a cure is not effected. If the instrument goes down near the end of the root, then there has been an extensive breaking down of the walls.

Dr. Riggs is entitled to the credit of the name. His treatment is simply the mechanical removal of the deposit. The speaker knows of no instruments but Dr. Riggs's that will do the work.

Dr. Rehwinkel. Does he mean to say that there is necrosis?

Dr. Shepard. No; there is a roughened condition of the border which should be removed, and fresh bone and blood reached. The same condition exists where there is an alveolar abscess with fistula; the surface of the bone is not healthful. The instrument not only removes the deposit, but stimulates healthful granulations.

Dr. Corydon Palmer said it was a waste of time to talk about this thing so much. There is not an old practitioner here but understands this operation; not an old woman but knows that "taking off the scurvy" will cure the disease. It differs only in degree. He would give all honor to Dr. Riggs for his instruments, and for bringing them into notice, but he thought he ought not to take up so much time about the matter; he had occupied a long time during the session of a New York society, and it was ridiculous. There is nothing of this thing except to remove the deposit, an operation which has been known since the earliest attempts to practice dentistry. The first thing a dental student learns is to take off tartar.

Dr. Barker did not agree with the last speaker that too much time was being taken up with this matter. Dr. Riggs, however, has no claim to the name of the disease. The disease has different characteristics; some cases are local, and are cured by removal of the calculus; in others constitutional treatment is necessary,—iron, quinine, etc. The disease presents itself in patients who are very careful of their teeth; families all lose their teeth, and nothing will prevent it. Five years ago he had published an article on the removal of foreign substances, and the use of sulphuric acid to remove the dead material, for which suggestion he was indebted to Dr. Atkinson. He uses tonics, and expects to prevent the disease, except in hereditary cases. It is one of the results of civilization, and he believed it is owing to the non-use of the teeth. When an organ is not used, we have retrogradation and atrophy. He urges his patients to go back to the use of hard food. Look at the Irish, who come to this country with hard teeth, which soon deteriorate when they are fed on the soft food they receive here.

Dr. Atkinson said he wished he could unravel the tangled knot which had been presented. It was in vain to attempt to understand whether the disease was constitutional or local. The field of pathology is so broad and has been so befogged that we cannot tell what we mean. Not a single man has called the disease an ulcer, and that is what it is. A congested condition of capillaries constitutes the serecoid line, and if the dead matter is not removed to a healthy line the disease will go on producing pus forever. Dr. Riggs is, like the rest of us, made up from his surroundings, and the worst thing about him is that he would not join societies. He does not think Riggs is responsible for the disease being called Riggs's disease, but he was weak-backed in allowing his friends to use the term. When men say that a constitutional disease is cured by local treatment, he (the speaker) leaves that statement to take care of itself. He does not claim to have originated the sulphuric acid treatment; it came from the other side of the water. No matter how thoroughly the tartar is removed, or how clean you keep it, if the disease is hereditary it will progress; the ends of the capillaries fail to keep up the nourishment. Ladies ought to have private lessons in the use of the tooth-brush. The brush should be rotated up and down. There is no such thing as a local disease, and there is no constitutional disease in full measure but death. If we could go down to the end of the root and reach the gristly wall, clear off the foreign material, and wash with salt and water at blood heat, and fill the pocket with aromatic sulphuric acid, that would be the proper treatment. When there is a pocket to hold the pabulum we can get reproduction, any man to the contrary notwithstanding. What is the law of reproduction? If the pabulum is properly entertained it will reproduce tissues, with the exception of muscular and glandular tissues; all nervous and fibrous tissues may be reproduced. What is the virtue of Riggs's treatment? It is the removal of foreign matters and cutting through the serecoid line; but he doesn't put in any medicament, so as to have a friend at court. If, after a week elapses, pus is found, he goes down in that place and treats as before; now, if you fill it with aromatic sulphuric acid you may kiss your patient good-by. Dieting is everything. When we eat we should have friends present at the table, and carry on an agreeable conversation, that each epithelial scale may laugh as it goes to join the saliva. When these nasty mouths come in it is enough to disgust any body that has not a paternal or maternal love. He says, "Father, forgive them," and takes them and washes them and lets them go.

Dr. McQuillen has met Dr. Riggs, and never met a more modest man, and thought his not taking part in the societies due to that trait. He has allowed himself to be placed in a false position. If he allows his students to call the disease Riggs's disease, it is the same as doing it himself. But he is in the same position with many others. We hear constantly about Dr. so and so's scalers, chisels, etc. There is often a fungous condition of the gum in this disease, and in such cases he (McQuillen) uses a little knife (which he exhibited) to cut off the superfluous tissue.

Dr. Rehwinkel said he had asked Dr. Riggs what his disease or claim was, but he had not responded. Why does he not disclaim the name? If the disease can be cured, he wants to know it, and will go one hundred miles to find out how to do it. There is probably not a dentist that does not know that foreign material must be removed, and whoever can do it best is the best man. Riggs is great on catching the Tartar! He has made it a specialty, and understands it, but he (Rehwinkel) does not think he has touched bottom; he wants to know whether there is necrosis. If there is absorption it must be a breaking down and solution and washing away. Resolutions passed in the Connecticut Valley Society said that thanks were due Dr. Riggs for new discoveries; but it is no new thing, but, on the contrary, it is quite common. Dr. Atkinson spoke the truth when he said it was an ulcer.

Dr. Judd said he thought he was befogged, and that he was listening to the description of a new disease when he heard about this "pyorrhœa alveolaris" of Dr. Rehwinkel's. He had analyzed the title of the paper, and asked the force of the adjective. It was probably intended to designate a flow of pus from the process; it would cover all flow of pus from these parts. There are cases where no pus is visible to the naked eye, when it can be discerned with the microscope. He thought we had better make use of the old terms; they are more definite and full as useful. If we did that we should come back to one term,—an accumulation of tartar. Pyorrhœa is only an accident of the disease,—a secondary consideration. The disease is suppurative inflammation and nothing else. There are great differences in the amount of tartar, and very good reasons for it; but that it differs essentially from other inflammation in the same locality he denies.

Dr. Rehwinkel said that Dr. Riggs described his operation as the removal of the deposit from all parts of the root to the apex. He has been more thorough than others, and goes to the bottom of the disease; and that is all that he claims, except the use of nicely-made instruments, which he (the speaker) had used with success. Many of us fail for want of thoroughness in this and other diseases.

Dr. Judd. Necrosis is death in masses, as the term is commonly used, but it is often used as relating to soft tissues. He would like to know whether in this disease there is death in masses, or only gradually.

Adjourned.

NEW YORK ODONTOLOGICAL SOCIETY.

Regular meeting of the society held at the residence of Dr. Charles Miller, No. 331 Madison Avenue, on Tuesday evening, May 22d, 1877.

President, A. L. Northrop, in the chair.

Incidents of Office Practice.

Dr. Frank Abbott. I would like to say a few words following up the case that I related before this society at its special meeting in January. I had at that time removed for the child the second molar on the left side of the lower jaw. Since that time, I have removed the molar on the right side of the upper jaw, at which point there is an abscess opening into the antrum. From the lower jaw I have removed ten or twelve pieces of bone,—a mass as large as the end of my thumb. I have been treating the case with a weak solution of carbolic acid, and have not produced any irritation or further sloughing or anything of that kind. The child has been under treatment by a physician, and he has succeeded in keeping up the system and in getting the child in much better condition than I should have supposed possible under the circumstances. Recently, there was a somewhat peculiar development in the case. About three weeks ago, the physician came to me and said that the child was complaining of pain in the side of the face, and he wanted to know the cause of it. The pain was undoubtedly caused by loose pieces of bone coming in contact with the unprotected inferior dental nerve, which was probably left uncovered by the surrounding bone being removed. As soon as the pus which had collected was thrown out the pain subsided, and there has been no recurrence of it. I removed a piece of bone this morning. We have been depending upon nature to do the work of restoration, and expect that eventually it will heal up, and perhaps all of the bone will be restored. This, to me, is a most interesting case, and that all present may understand it, I briefly again relate its history. The cessation in the development of the roots of the teeth caused the abscesses which produced this trouble. A year ago last February the child, two years of age, was taken with inflammation of the lungs. In my previous statement I had reversed the order of things. Before recovering she took the measles, and ere recovering from the measles she was attacked by the whooping cough, and it kept her in such a low state that everything about the child ceased developing, the teeth of course taking part in the general cessation. The molar teeth were formed with the exception of about an eighth of an inch of the ends of the roots. When recuperation commenced, these teeth did not take on renewed life. They didn't go on and finish up the work of fully developing, so that the rough ends of the teeth became an irritant, and caused an abscess on the left side of the lower jaw and on the right side of the upper jaw. The teeth had every appearance of being sound, so far as looking at them in the mouth was concerned. About a month before the abscess broke through, a dentist refused to extract the teeth. He said they were sound as teeth could be, and would not extract them. If he had removed them, the abscess which broke on the outside of the face would probably have been prevented. If the teeth had been extracted and cold applications put on, there would have been no further difficulty, in my opinion. The teeth were white and clean.

Dr. Charles Miller exhibited a boy, twelve years of age, from between whose central incisors he had extracted a supernumerary tooth, having the appearance of a very large, malformed, single-root bicuspid.

Dr. J. B. Rich. For a long time I have been in the habit of using —where the teeth are irregular and the rubber dam would not stop the moisture—one, two, three, or four washers of rubber, put on ahead of the dam, and pushed well toward the neck of the tooth; sometimes one will not be sufficient, but two or three will always answer in filling up any irregularity in the form of the teeth, so that the rubber will clasp it at every point. In some cases, where it is very difficult to keep out moisture in any other way, this plan is quite effectual. I have used it with satisfaction and I thought I would mention it. To make these "washers," I punch, out of sheet rubber, little disks about the size of a five- or ten-cent piece, and then punch a hole in the middle with an ordinary punch. Sometimes, when everything else has failed, by stretching this rubber "washer," and taking a turn in it, making the same piece go around twice and making the cross go over the depression in the tooth, it has stopped the leak very effectually.

A paper upon "Devitalized Teeth and their Management,"* by Dr. F. H. Rehwinkel, was read by the secretary.

Dr. W. H. Atkinson. This is one of the very few papers that come before us that is entitled to or able to bear severe criticism. The gentleman being well learned, is much more likely to lead us astray when he is in error, because of his clearness of statement where his statements are true, for the reason that our confidence is gained by the clear coincidence of our own judgment with the main statements in the paper; therefore we had better be a little cautious about accepting the whole. There are two or three statements in the paper that are radically wrong. There is a statement that the bone of the alveolus is sustained by a separate membrane,—that is not called root-membrane. That is false. The bone is not sustained by the proliferation of cells from any membrane in the socket. The cement is thus sustained, and the essayist says so. That is one of the old errors, and one of the Sloughs of Despond in which learned men most easily slip. That is the old doctrine, a dogmatism, and not pertinent to this case unless he were speaking of diseases of the socket. If he were speaking of diseases of the socket, then the health of the bone-structure would be involved, and a complete statement of the properties of that would be pertinent and valuable; but in many of these papers we lug in side-issues, by way of interpolation, that render otherwise excellent papers dangerous to follow, especially where those to whom the papers are addressed are not up, neck and neck, with the writer, or in advance of him. In the main I would indorse what he says, and as he means to be understood. I think he is to be indorsed with regard to the statement of the difference of constitution laying a basis for difference of treatment, but when he makes it as strong as he does, I think it is a mistake and liable to lead us astray. Wherever there is vitality enough to return to the normal action identical treatment is sensible throughout the whole range, so that we need not complicate our ideas of temperament and treatment. If you control the nerves generally, your treatment is identical in every case. He advises us to extirpate, boldly and promptly, those pulps that have remnants of sensitive substance. He spoke especially of where the pulps in the chamber were devitalized, and when you come to remove them, you find the nerves in the roots of the teeth sensitive. He advises thorough extirpation in all such cases. I would take direct issue with the advice there. Wherever there is an amount of sensitiveness sufficient to awaken the patient's sensibility, it is evident that there is sufficient vitality for that pulp to slough off the dead portion; and wherever sloughing does occur, you will get a process of healing. In his malarial district this might not be. It is a place where the functions are interfered with, where there is no good pabulum out of which to make tissue. It is blood material, the blood-making organs, that suffer from taking the bad air. He is in an agueish district. When he took his degree, they did not know that there were cells. It was not communicated generally, it was kept out of reach, and we knew nothing about it until within twenty-five years. There is where I take issue with him. Where there is any portion of a living pulp, preserve it by all means. The physicist says it is "past molecular experience." Then preserve past molecular experience. Wherever you can get healing, get it. Wherever you can conserve the fragment of the pulp of the tooth, save it.

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* This paper appeared in the DENTAL COSMOS for October.

He advised going through the foramen of the root. I cheered that. It is right, because you have to go through to get fresh blood. All these abscesses are limited by scar-tissue. What you want to do is to reduce that scar to a clean, fresh wound. Go right through until you get the blood fresh and free. So that I would take issue there, and yet indorse what he means. He didn't say to bleed it, but he did say there was a pyogenic membrane; he took out the sac and the abscess promptly healed. We are to take the paper and carry it out, and not take the effete teaching with the affete; we are not to take into our professional stomachs the unprepared pabulum or affete matter. With these two differences I indorse the paper as sound. I know the gentleman. He is honest, and I know he is capable. It shows that we are standing like a band of brothers, correcting errors where we see them. If we perceive an error, correct it in the spirit of honesty. If I am wrong, then I shall be happy to be corrected. I only desire to see our profession come up to the high and worthy position to which we have been striving to bear it, and which we seem ready to claim with some degree of consistency and justice.

Dr. Wm. Jarvie, Jr. I think Dr. Atkinson is laboring under a misapprehension as to what Dr. Rehwinkel says with regard to two membranes being within the socket. This is what he says: "Let it be borne in mind that through the loss of the vitality of the tooth-pulp the main supply of nourishment is cut off, and that the only dependence the tooth now has is through the root-membrane, upon the cementum, the only part of the tooth endowed with vitality. At the same time the periodonteum is also called upon to nourish the bony walls of the alveolus, and is its periosteum."

Dr. Atkinson. That is what I told you.

Dr. Jarvie. I understood you to say that Dr. Rehwinkel claimed there were two distinct membranes within the socket of the tooth.

Dr. Atkinson. I did say two membranes, but I said it on purpose to call attention to it. I say that there is no membrane known in the human body which proliferates cells on both sides. I did it to call up to the mind of those who were not sufficiently posted to make it clear. I meant what I said and said what I meant. I give my apprehension of the truth as it is.

Dr. Jarvie. The essayist makes the point that it does a double function, but calls it one membrane.

Dr. Atkinson. No membrane nourishes any tissue. Membranes are made up of connective-tissue fibers, and they are no more capable of nourishing the tissue than the scaffold-poles on the outside of the building are capable of building the bricks in the wall. It is the blood-vessels that bring the material and the nourishment there. In the old physiologies, every one thought the periosteum was the bone-nourisher. It has nothing to do with it. It only stands as statical tissue to hold the vessels, that they may bring pabulum to the part.

Dr. Frank Abbott. I must take issue with Dr. Rehwinkel, and also with Dr. Atkinson, in regard to the running of instruments through the foramina of the roots of teeth. I think the most severe cases of abscess have been where the drill has been run through the root. It may be that my cases have been where the drill has been through the side of the root and not through the canal. But there is no safety in running the drill through the end of the root. I have a case now under treatment where a dentist ran a drill through the foramen, and it is utterly out of the question to cure the trouble. I have tried everything I can think of; still, it kicks up a row every time I do anything with it. It is simply because the drill has gone through and the root is rough at the point, and so keeps up an irritation. Nature made it round and smooth, and the moment you put a drill through you spoil the whole thing.

Dr. E. A. Bogue. I should like to know whether Dr. Atkinson considers it always expedient to save the eighth of an inch of pulps in the root-canals of teeth where the remainder of the pulp is dead?

Dr. W. H. Atkinson. I don't know how we would be able to determine that there is just one-eighth of an inch there. When there is enough pulp left to indicate sensibility there is enough to make the effort to secure healing. I have noticed a number of instances of straight roots of the front upper teeth, whose pulps have been mutilated and cavities for pivots drilled, and the pulp heal above and remain very well for many years. If we could do that always we should be much more successful than we are in having our patients wear pleasantly teeth which are set on pivots. I never think it justifiable to kill a dear little babe that is struggling against disease; but when the dear little fellow is dead, I would bury him out of the sight of his friends. Help any portion of the system that has a duty to perform. Don't put stumbling-blocks in its way. I can't resist the impulse to say a word or two about this ragged-edge irritation. Let us only say positively about those things which we do know. It is not good policy to go through roots of teeth on the side. I said particularly that I went through the foramen where they were straight. I should not be afraid to go through. I have cured abscesses frequently in incisors, when they have resulted from the drill being run through the side of the root. I have cured bad cases where the external plate of the alveolus had been taken away by these interferences. If there are ragged edges, just remove them by file or bur. It is an easy thing to do, and the sooner we get into the idea that the greatest tenderness is doing things just right, and not hesitating, and so have our hesitation and mental and moral condition propagate itself upon the patient, the better. Be thorough and at the same time gentle.

Dr. Frank Abbott. In regard to going through the side of the gum, etc., with a bur, Dr. Atkinson may do it nicely. I glory in the spunk of his patients, but a great many would object to it. We have got to do something a little different. If you have a tooth with a canal and foramen large enough to allow a bur through and run back and hoe around, I don't believe you are going to cure any abscess at the end of it. I never have been able to do it and cure an abscess absolutely. I can't do a good many other things that others seem to do. I would like to see a gentleman run a bur through the foramen, draw it back and hoe off the end, so that it shall be smooth enough to admit of granulations, because there must be granulations to heal.

Dr. E. A. Bogue. Eight or ten years ago I had occasion to drill into the antrum through two teeth. The drill was pretty large. Those teeth have since been filled, and remained well up to the present time.

Dr. Jarvie. What teeth were they?

Dr. Bogue. Second bicuspid and first molar.

Dr. Jarvie. What root did you drill through?

Dr. Bogue. Not through either root. I went through the crown and soft parts intentionally.

Dr. E. A. Bogue. Will Dr. Atkinson tell us the process of the formation of the sac in cases of alveolar abscess?

Dr. W. H. Atkinson. In the first place, arrestation of the blood in the capillaries in the part results in their distention and the exudation of lymph, which coagulates among and within the capillaries, preventing the corpuscles continuing through the obstructed blood-stream, and only permits the serum or white blood to weep through the capillaries. When the force is sufficiently strong it makes a swelling. When that has a space where a pulp has been removed or any portion of the tissue removed, it will be likely to collect, and it begins to coagulate. That makes your base, into which afterwards come white blood-corpuscles, that set up a process of fibrillation between the seams of this coagulated lymph, making a jelly-like mass. Reproduction follows the same rule as production of the tissues in embryology. The same respect is paid to brick and mortar by the man who repairs, as by him who makes a house; he respects the same law in repairing that he obeyed in building it. And we must bear in mind that the integrity of the elements of tissues is essential to their normal production in all instances. When the jelly-like mass out of which we seek to reproduce lost tissue takes a retrograde step, and the fermentation of tissue-elements occurs, we are met by the production of pus, sanies, etc., instead of normal tissues, the morbid tissue agreeing with the degree of degeneracy permitted to display itself by reason of weakness of constitution, neglect of hygienic measures, or maladministrations of remedial agencies. The sac is nothing more than the line between the old and new tissue, a sort of disputed or neutral territory, made up of simple connective tissue as a base of supply through which the exudate filtrates, simulating the amnion inclosing the fœtus in which tissues are produced agreeing to the type to which it belongs.

Adjourned.

REGULAR meeting of the society, held at the residence of the president, Dr. A. L. Northrop, No. 44 West Forty-sixth Street, Tuesday evening, June 19th, 1877.

INCIDENTS OF OFFICE PRACTICE.

Dr. W. St. George Elliott. I would like to call your attention to two or three little things brought for your inspection this evening. Objecting to the general form of the dental factotums as sold at the depots, I have had made one, which, while it accomplishes all that other factotums do, has at the same time a much more symmetrical appearance. It consists of a metallic sphere about two and a half inches in diameter, with the usual tray for gutta-percha, covering the opening on top. A pocket on the side keeps the mouth-mirror warm. The whole is attached to a peculiar form of Bunsen burner, which, having a valve at the bottom, enables one to regulate the amount of heat necessary, and yet allow the proper proportion of air to gas. This burner, the invention of a German chemist, is most useful for any purpose where heat is required. In practice, however, I find it to be impracticable to keep the gas burning when it is turned down sufficiently low, that the temperature may not exceed 120°. However, when warm water is required, instead of keeping a light all day, the gas is turned on full force, and in a few moments the water is heated, and, as the sphere is bright and radiates slowly, it will remain sufficiently warm for half an hour, the gas being, of course, turned off.

But as many object to the cost of this, as of the other factotum, allow me to present to your notice another answering the same purpose and at one-tenth the cost. A kerosene night-lamp, as sold in all the shops, has attached to its glass shade by a brass pedestal or leg a metallic disk or table some two inches in diameter, and located about the same distance above the flame. If it is desired to heat water, a small Japanese tea-cup is filled and placed upon this table. By turning up the wick it will heat with a fair amount of rapidity, and when sufficiently warm, if the wick is turned down, it will be maintained at that temperature all day; the day's expense being about one ounce of kerosene. If soft gutta-percha is desired, it is placed in a watch-crystal upon the table. The flame of these night-lamps is remarkably free from smoke or smell.

Last winter I had the pleasure of showing you a new form of saliva-ejector, and I shall take this opportunity of bringing before you a slight modification of that form. Whereas then a glass tube was used as the long end of the siphon, now I use a rubber tube, so that practically the whole device consists of rubber tubing, with the exception of the glass mouth and the metallic connection of the supply-pipe with the main; as you know, water is allowed to gently flow through the long leg, thus creating suction above. I would add that nine months' use has satisfied me of its efficiency.

If you will kindly indulge me for a moment longer I will ask you to inspect a new amalgam porte. It consists of a tube open at both ends, but with a slot in the middle, through which slot the handle is screwed into a solid iron cylinder filling the tube, but of only half its length. This tube is loose, and free to move to the full extent of the slot. The amalgam is placed in either end of the tube, carried thus to the tooth, and is deposited either in or on the part to be filled by merely pressing the handle, thus forcing the amalgam out of the tube. This tube may be at any angle with the handle, but I think one of 45° most suitable.

Dr. Barnum. I would like to speak of a case of the transplantation of a tooth by Dr. Hurlbut, of Springfield, Massachusetts. He extracted the right superior lateral, on which there was an abscess formed, cleansed the alveolus, and inserted a tooth which he had boiled in alkali, scraped the root, and filled the canal with oxychloride of zinc. This dead tooth I saw three weeks after it was put in position, and it seemed quite firm. The patient was wearing it without any fixture to retain it in position. No inflammation was present.

Dr. N. W. Kingsley. I am reminded by a little model placed in my hands, of a subject brought before you at the special meeting of the society held in January. Those of you then present remember I discussed the subject of the extraction of teeth in the correction of irregularities. Subsequent to that period I was writing on the same subject, endeavoring to place the matter upon some basis that would make it clearly apprehended by every one, and that would show that I, at least, had some principle to govern me in such matters. I found it almost impossible to establish any rules, but while my mind was upon the subject there came a case where I had the opportunity to test my judgment. The patient was a young lady of some sixteen years, whose central incisors were pitched inward a little, with the laterals lapping over them about one-half their diameter. The canines were prominent. The teeth back of the canines were regular, but the lapping of the laterals and the slight depression of the centrals was such as to make a marked deformity. I canvassed in my mind the propriety of extraction, and formed the opinion that it would be unwise to extract any. I could enlarge the upper jaw and bring the teeth in the regular line, there being but half the diameter of a tooth on each side to gain. That opinion was given some six months before the patient came into my hands for treatment, which was about the 1st of March, and I then began to reconsider the opinion which I had previously given; and finally, to satisfy myself, I pursued a course which I will detail and which is the object of my speaking on the subject. I took models of the upper and lower jaws, and articulated them. I cut out from the plaster model the first bicuspid on each side of the upper jaw and rejected it; I also cut out the canines and laterals, and proceeded to set the canines and laterals back in the space that was before occupied by the three teeth, covering up the space where the first bicuspid was taken out. I found that the canines were unnaturally prominent, so that by reducing them in the arch,—making the arch smaller, moving backward both the laterals and canines, and making a little space between them, I was not disturbing the articulation of the teeth, and was making a perfectly regular arch. The only objection was the slight space between the teeth, which was not a serious one. I reversed the opinion given six months before, and extracted the first bicuspid on each side, and proceeded to move the others back. They have come back into their position better than I arranged them on the plaster model.

The apparatus was a plate across the roof of the mouth, anchored so that it had two molars as well as a second bicuspid on each side for support. Unquestionably, the action in moving the two teeth each side had its influence on those three teeth, because by the time I got the canines and laterals to the line of the arch the space was closed up, or nearly so, and I had to put something between the teeth to keep them from closing up entirely. In three months the whole thing has been accomplished, and I believe far better than it would have been if I had attempted to spread the jaw and bring the teeth into line. I say far better, because I saw that spreading the jaw to make it large enough would advance the upper lip so as to cause a disfigurement. The object in detailing this experiment is this, that in my own experience I find a great many instances where it is impossible for me to form a definite opinion upon simply looking at the mouth, and that it helps me very much to get the model and regulate the teeth in the plaster, and if I do not like them one way I can try another. I can bring the teeth in the mouth to pretty nearly the same arrangement as in plaster. Such being the case, those who are doubtful of the result of extraction will probably satisfy themselves definitely by such an experiment.

Dr. W. St. George Elliott, of New York, read the following paper, entitled "Skill *vs.* Knowledge."

I propose this evening to take up briefly, and in a cursory manner, the subject of Skill *vs.* Knowledge, and to point out as plainly as may be the dangers that present themselves to us as a profession. I feel the more impelled to take the stand I propose from the fact that at the present moment there is manifesting itself throughout our ranks a mistaken feeling that the road forward is a literary one only, and that progress must be made by opening up new channels of investigation or more thoroughly working those already well worn.

The character of the papers and discussions of our dental societies, as well as that of our professional literature, points out unmistakably this tendency of our times. Now, I would not say aught against experimental knowledge, or in any sense undervalue high technical attainments; on the contrary, I believe in them most thoroughly, and would fain have our workers increased tenfold. Knowledge is latent power, which, in the hands of the skillful surgeon, is the power of life and death. Knowledge is not the rival, but the guiding genius of skill; so while we do not wish to depreciate the one, we are the more anxious that the other should not be allowed to fall into the background. If only one can be secured, by all means let it be skill. Better the ignoramus who can save teeth, than the most learned histologist who cannot. Of course it is understood that by skill is meant that dexterous use of the fingers together with that amount of mental education that the experience necessary to the acquisition of that dexterity has given the mind. The writer has been led to bestow some thought on this matter from his observations among the profession in England and on the Continent, together with inquiries into the causes of the markedly inferior work done by our brethren abroad. Six years' experience in foreign lands, where nine-tenths of those who applied for dental services had been the patients of English or Continental dentists, allows me with truth to say that I never saw a good gold filling made by any one who had not received his instruction in America, or from an American. Please to remember I do not state that no good fillings are made by our honored brethren abroad, but that it has not been my good fortune to have met with them. The extreme Eastern field, that is, China, Japan, Malayan Isles, Siam, etc., is now fully occupied by a force of seven, of which number six are Americans, all proficient in their business; in India there are some fifteen, only one being an American; and while he sustains the national reputation, the others are no worse than those found on the Continent. Personally I did not have the opportunity of examining very much of the work done; I was informed, however, by one who I think might be considered representative, that none of his co-laborers in that field made much effort to save teeth. Extraction and artificial work, with some amalgam, composed their repertoire. Subsequently I found the same condition of affairs in Europe. In this brief statement of the character of the service rendered abroad we find our reasons for thus bringing before your notice the fact that lack of skill, and not want of knowledge, is their deficiency, combined with a non-recognition of what is attainable by skillful manipulation, with perhaps a lack of ambition to excel in mere skill, and a suspicion that there is not that fraternal sympathy that is so conducive to unity of effort. You are all aware of what has been done for dentistry abroad. Her books and papers enter into almost every field of inquiry. To Germany and England will we ever be indebted. They have done more, vastly more, towards elucidating complex pathological and physiological problems than have we. Gentlemen, it is my conviction that we may spend years in investigating questions in microscopic anatomy; we may attain world-wide celebrity as authors, and our names be handed down from generation to generation, and yet if we have not skill we are not good dentists. We may be able to recognize species, families, etc., by peculiarities in their respective teeth, and have a clear insight of the formative process, yet this knowledge will not enable us to put in a good gold filling. We have not a countryman practicing abroad who can at all compare in professional mental culture with many about him, and yet the name of an American dentist carries with it its synonym—skill. Far be it from me to boast of our professional status, but in bringing before you this question, "What gives us our position abroad?" I beg your recognition of the means that have made us what we are. With your permission I will illustrate how little is thought of skill in London. A gentleman residing there, and whose name is familiar to us all, and who has done much for our advancement, when speaking of filling, remarked, "Why, this stopping of teeth is work for a mere mechanic. I employ assistants to do that, while occupying myself with more professional matters." In giving so much prominence to skill, do not understand me as accepting for it the low position assigned by many, either intellectually or socially. The genius of Tintoretto, and perhaps more markedly that of Canova, would be nothing without their power to perform. Neither knew as much of painting or sculpture as Ruskin of our day, but Ruskin cannot paint. Neither should the mechanical be cultivated to the exclusion of the intellectual. The French weaver working for years on a bit of Gobelin tapestry is a mere automaton, except that he may have imbibed from his daily toil that love for the beautiful which will subsequently enhance the value of his handiwork. The watchmaker spending years over a complex or minute piece of mechanism may be an example of pure digital culture. We must not forget that if the mind is, in a measure, unoccupied, there will not be that healthy co-operation with the hands that is so essential. If we recognize the importance of this matter, it behooves us to take such steps towards our own improvement as may be thought expedient. Patients have a right to expect that we not only take interest enough in our profession to care to qualify ourselves in the bare necessities, but that we shall give that time and attention towards our own improvement that will enable us, while doing the best work, to do it in the least time and with the least expenditure of vital force, either of the patient or dentist. He who would excel gives his time and talents to his prosession. It has been said by Sir William Ferguson that his mind was so fully employed that there were scarcely two of his working hours occupied in any other than professional channels, and yet how many do we find in our own specialty who hurry through their labors, that they may have the more time for the road, the rod, or the billiard cue.

Skill is either labor, and means labor, or is its outgrowth. We cannot attain it by either the study of books or by any mere mental process.

While the capacity for skill is born, not made, mechanical dexterity can be largely taught by mechanical means. If a person of ordinary intelligence be subjected to a thorough training process in any mechanical vocation, his proficiency will be governed in great proportion by the character and amount of that instruction. A good blacksmith or an expert surgeon can reproduce in his apprentices or students his own skill. Of course we recognize in these matters the different mental capacity of individuals. While one may reach a degree of proficiency in one year, others may take three or five; but still, in the main, mere skill is so much the result of persistent effort that it is within the grasp practically of all, and where it does not exist, we may infer that either there is unwillingness to attain or gross stupidity.

Ingenuity, judgment, etc., are essential in the successful treatment of diseases of the teeth, and cannot be created by education, yet as they are possessed to some extent by all, they can be made even prominent characteristics. We all recognize that relationship which exists between skill and ingenuity, not necessarily that ingenuity which brings forward novel but often useless devices, but that inventive tact which makes the proper use of expedients to overcome difficulties or to accomplish a given result, as exemplified in the use of screws, pins, etc., and in taking advantage of the peculiarities of the conformation of a cavity; in the recognition of what is the best filling for a given case, and in the thousand and one resources at the disposal of him who battles against caries. The whole art of mechanical dentistry is built upon this foundation.

Dr. Marion Sims, when asked on one occasion what was the secret of his success in practice, said, "I owe all I am to these fingers; without the skill to perform I would be nothing." The late Dr. Bedford always took occasion during his course of lectures to call attention to the great necessity of digital skill in his department of medicine, and frequently expressed his ability to diagnose any uterine disease by the mere touch.

What are the means at our command by which we may attain greater proficiency in this matter? First in importance is physical education; for manifestly if we are dyspeptic, feeble, or chronic sufferers from rheumatism, we cannot in the very nature of things have that command over our muscles which we should have. Every effort must be made to develop physical strength; not that our calling necessitates strength above the average, but the very highest order of muscular control is almost imperative. This control must not be weakened by systemic disease or debility. As a means towards this end, allow me to suggest the regular use of the so-called Health Lift. Two rings fastened to the floor, with ropes and handles attached, accomplish all that the more expensive machines can do; although to some it may be a satisfaction to know how many pounds can be raised, or what may be the rate of improvement.

Perhaps next in importance is horseback exercise; these two means, together with a diet adapted to the digestive powers of the individual, will accomplish all, or almost all, that can be done. I speak advisedly on this matter. Three years of inconvenience, not to say suffering, taught the writer that his appetite was greater than his digestion, or rather that the food taken into the system was greater than that required to sustain the physical strength called for in the exercise of his daily duties. When the cause was discovered the remedy suggested itself.

Should there be no necessity for physical culture, it were well that the muscles of the hand be well exercised and instructed. To this end piano-forte manipulation, drawing, target-shooting, etc., will be found useful; but a matter of much importance, and one very generally ignored, is the proper development of the powers of the left hand. Anatomy teaches us that it is the equal of the right, but how unimportant are its duties! The writer has derived much benefit from the practice of writing with the left hand, which practice has enabled him at times to make use of two pluggers at the same time, struck alternately by the mallet, as well as to place the gold *in situ* with the left, while the right is fully occupied with the instrument. Drawing circles on the wall at arm's length gives practice not only to the hand, but teaches steadiness to the arm. Of course it will be recognized that by actual practice at the chair we receive most of our digital education; but we must not forget that where there is no ambition to excel there will be no realization. "Good enough" has kept many down who were capable of better things.

We should cultivate the habit of order as the handmaid of skill, not only in the general arrangements and condition of one's professional appointments, which should be neat but not gaudy, but also in that of our instruments and appliances. It is unnecessary for me to mention the disadvantage labored under when for some special form search is made under a pile of soiled and broken instruments.

Skill should always be assisted by the use of every appliance proved to be useful; for manifestly he who does not make use of these things adds to the difficulties of the situation.

By skill alone the Asiatic, without improved tools or appliances, produces beautiful work. The Indians living at Allahabad, with a lathe made of a bundle of sticks and worked by the feet, turn out work that rivals in apparent accuracy that of the watchmaker—this by mere dexterity; but give to these men modern appliances and teach them the use of them, and how changed the result! The most perfect human skill cannot turn a true sphere or cylinder unaided, and it is the possession of these appliances that distinguishes the work of the civilized from the semi-barbarian. The Singalese, seated under his native cocoa-trees and working to the music of his ever-restless sea, though he can drill minute holes in the gems of his native hills and delicately mount them in rings of gold, could not make a perfect wheel, much less a watch, for his is merely the skill of the fingers and almost without mechanical assistance.

In conclusion, permit me to say that while all may admit the value of great command over the fingers, how few will acknowledge that their manipulation might be improved. Unskillfulness is the weakness of our neighbor, but never of ourselves.

But not only is this talent far below what it should be, but a deplorable want of order and system is visible throughout the profession. Not ten per cent. of our brethren have any regularity either in their manipulation or in their instruments and appliances. To be sure, it is just as true out of the profession, the mechanical trades being sad illustrations of "how not to do it" or where not to find it. Whatever consolation there may be in this we are welcome to.

It is high time that our colleges gave some attention to this all-important matter. Experience is a good teacher, but, unfortunately, it is the patient, and not the dentist, who suffers while a sufficient stock is being secured. There should be graded steps that all should pass over in the art of filling a tooth. As well might an artist give his pupil the creation of a master for his first model as for a student to be told to fill a given cavity, without proper practical instruction.

Dr. J. B. Rich. In the paper just read the essayist appears to have stated the whole subject, so that there is nothing left for anybody else to say in regard to it, and I for one am very much indebted to him for the suggestions it has enforced, and the able manner in which he has presented the whole subject of the essay. That part of it where our attention is called to the great advantage the dentist may derive from correct physical training, commends itself particularly to me, and ought to command the earnest consideration of every member of our profession; there is no class of men who need it more than they do, and, as a general rule, there are none who appear to attach less importance to it.

All men whose avocations mainly consist of the execution of delicate manipulations, ought to give particular and earnest attention to the harmonious development of the whole of their physical systems, and this ought to be done not only for the purpose of maintaining the general health, which is of the first importance, but also that that part of the system which is the most used in the occupation of the individual should be kept in the most perfect tone and condition for continuous use. The exclusive use of any one part of the system to the neglect of the other parts will surely produce the early decay of the whole. This result is particularly noticeable in dentists, who, as a general rule, lose their health and break down earlier in life than men following the other liberal professions; it is not often that a dentist is found in the full possession of the faculties that are necessary for the efficient practice of his profession after fifty years of age. And yet this ought and would not be so if they gave only ordinary attention to the laws of health, for I do not know of any other profession in which the general conditions surrounding its practice are so favorable to the employment of the best-known means for preserving and maintaining a high condition of health. The dentist performs his labor in a room that must necessarily be light and well heated, and which he may adorn to any extent, make as cheerful and comfortable in every particular as he may desire; he can generally select his own time and the number of hours he ought to work, can sit or stand as suits him best, and with a little management he can have the atmosphere he breathes of the proper temperature, and entirely salubrious, and yet, as a class, dentists do not enjoy good health and rarely make old men.

I attribute this mainly to their disregard of thorough physical training, and I believe that if they paid the attention to it which the health of their systems demands, they would get along as well as men of other professions. The remarks of the essayist upon the subject of the cultivation of the left hand are highly important, and if dentists follow the suggestions made by him on that point they cannot fail of being benefited by them.

Dr. N. W. Kingsley. There is one point in that paper which I would like to emphasize,—that which refers to system and order in our offices. I do not say that my own office is not open to criticism in this respect, but I have been in offices of my brethren where, upon inquiry for a certain instrument, a whole panful would be pawed over with the remark, "I know it is here somewhere, I had it but a few minutes ago." The old adage of "a place for everything and everything in its place" seems to be ignored. My own effort for some years past has been to keep everything perfectly in order, and a part of the system which I have established is the arrangement of my instruments. Using, as I do, hand-pressure in filling, not altogether but very largely, there must be quite a variety of shapes and points. These pluggers are arranged in a rack in a drawer. Every one has its place, and its place is known by its portrait painted on the bottom of the drawer, under the place where the instrument lies. Those in pairs are put together, and are marked so as to be kept together. I can in my mind see every instrument I use, I know its place, and I could shut my eyes and put my hand upon it. So with the other instruments, there is a place for every one. and as the duty of putting them in place devolves upon my assistant, it is no tax upon me. Immediately on my leaving a patient, all these instruments are wiped and put in place,—even while I am washing my hands. I go to the next patient and begin anew. Such a system is very easily cultivated. A great many men are lacking in their bump of order; it seems to be an undeveloped organ. It is easy to cultivate it. It is very easy to form such a habit. if you have not, and after a little time it becomes of such importance that you would not willingly go back to the former haphazard practices.

Dr. W. H. Atkinson. I am always pleased to listen to a paper from brother Elliott, and as it has been suggested that the paper ought to be discussed, it behooves us to learn what kind of principles are offered to us. So far as the practical detail and ingenious method of balance is concerned, I would indorse everything that I understood to be contained in that paper, but so far as making a distinction between some of the basic principles that have been named, I hold we have an example in the effort made, exactly amenable to the kind of criticism which is leveled at those persons who have knowledge without skill. The paper says that knowledge is not power, but latent power. Any one who has entitled himself by his observation to be able to make such a statement as that ought to be so informed as to know that power is never anything else than latent. The moment power becomes active it is a force, whether it be mental or physical. Having ourselves freely received, we ought freely to give, as Dr. Elliott has done in suggestions in the way of manipulation, and in the machinery that he has presented here, as well as in his paper. If, when pronouncing ourselves, we be well based in the principles that will relieve us from the antagonism of partial expression, we shall be better able to apprehend that there is no skill without its modicum of knowledge, but that there may be a great deal of knowledge not checked out of the bank on which we make our drafts.

Drs. Barclay, of Pittsburg, and Cravens, of Indianapolis, being called on, asked to be excused from speaking.

Dr. J. M. Howe. I have thought that in the discussion of fees, applying it to the subject of this evening, we might do ourselves and also the dentists on the other side of the water injustice. I was particularly impressed when Dr. Elliott was reading his essay with the application of his title "Knowledge *vs.* Skill," by his reference to what has struck me a number of times, the amount of knowledge that is displayed by dentists on the other side, in the books which we all are privileged to study. The amount of research that those men must have devoted to have given us the fruits of their labors as they have, must have been very great. It has occurred to me before to-night, how difficult it would be for dentists who gave themselves to the study of those subjects so as to be able to give us what they have given us, to devote themselves to manipulatory skill so as to acquire great proficiency in that direction. I have seen within a year or two quite a number of patients from Europe who have been under the treatment of well-known men, and I have not seen in any of these mouths any evidence of as high a degree of skill in filling teeth as is quite common here, and yet some of them are men that I suppose know a great deal more than the most of us. I think the title and treatment of the paper is very apt, in directing our attention to a possible tendency of the profession in this country at this time, that we may not allow ourselves to be led too much in that direction.

Dr. Strauss, Paris. Mr. President,—I have a few remarks to make in regard to the dentists on the Continent. In the first place in regard to the fees. I have noticed that among the better class of dentists there, speaking principally of Americans as a matter of course, and among the better class of patients which I have had occasion to notice in St. Petersburg, Berlin, Vienna, Paris, and London, that the fees are uniform with the fees of first-class dentists here. The prices vary from five dollars to fifty dollars for filling teeth, and not less, but rather more. Artificial work pays better in general. In France an American will not put in a set of teeth for less than eight hundred francs, which I believe is about one hundred and fifty dollars—a little over. The art of dentistry is in general among the better class of people in Europe as much esteemed and looked for as here in America. Your next meeting, I believe, is in October. I could then with the greatest pleasure give you a fuller idea of my experience in dentistry of the last ten years in St. Petersburg and in the other cities which I have named. As a general thing, I have found that there are great mistakes made here in regard to the profession in Europe.

Dr. J. B. Rich. Does this mistake apply to the native or American dentists who are practicing there?

Dr. Strauss. The native dentist has not the standing that the American dentist has in Europe, in England or in France. There are some exceptions, such as the dentist to the Prince of Wales. Those dentists are reputed as a matter of course, and from those persons they get first-class prices; but as a general thing the prices are much better in Europe all over,—it must be borne in mind I am speaking of the aristocrats in Europe,—they pay better than in America.

Dr. J. B. Rich. The gentleman who has just spoken makes his statements as regards the prices charged by the dentists of Europe as one who has just returned from a long residence there, during which he has visited the principal European capitals. I would hesitate to say anything that would appear to contradict his statements if they were not so entirely at variance with all the opinions I have entertained upon that subject. My sources of information lead me to the conclusion that there is no place in any of the countries of Europe where it is possible that the average charges, made by the dentists of those countries, can be half what the average charges are here. The pecuniary condition of the masses of the people of Europe makes it impossible; they have not the money to pay for dental operations. The money of this country is more evenly distributed among all classes of our people, so that a large proportion of them are enabled to have the necessary dental operations performed upon their teeth.

It was this condition of the people of this country in regard to money that was the primary cause of the rapid development of the dental art in the United States; large numbers of intelligent men found employment in the practice of this profession, and its development was the result of their experiences.

Less than fifty years ago the condition of dentistry in Europe was such that there was not a single dentist practicing there whose fillings would have been considered as even second class when compared with the fillings of the best American dentists of that time. American practitioners have raised the standard of dentistry to the high position it now occupies in Europe, and they maintain it there, and, as far as they are concerned, I have no doubt that they receive fees for their services that will compare favorably with the average prices received here. But I do not believe that the fees charged by the European dentist proper will average as much as half what is charged here.

Dr. O. E. Hill. I presume Dr. Rich may be right, but I am afraid he judges from the immediate vicinity in which he resides and practices. Before the war fees for dental operations were very much lower than they are to-day. Throughout the country you can procure full sets of teeth for from five to fifteen dollars, and the fees for filling teeth with gold are from two to three dollars,—rarely over three dollars. In New York, Brooklyn, Philadelphia, and a few other large cities, of course the fees are much higher, but when we speak of the fees for dental operations in the United States, we must take the average throughout the country. I believe that dentists in the United States as a class do more work for less money than dentists in any other country. We must not take the fees received in New York City as a fair sample of what is received for dental operations throughout the United States. I think the gentleman from Paris is fully as near right as my friend Dr. Rich.

Dr. Hill moved that Dr. Strauss be invited to prepare a paper on the condition of dentistry in Europe, giving his experience and observations, which was adopted. Dr. Strauss consented to prepare such a paper.

Adjourned.

MISSISSIPPI STATE DENTAL ASSOCIATION.

The third annual meeting of the Mississippi State Dental Association was held in Canton, Miss., August 15th and 16th, 1877.

Vice-president, Dr. T. O. Payne, in the chair.

Drs. W. H. Marshall, of Oxford, Miss., and M. C. Marshall, of Winona, Miss., applied for membership, and were duly elected.

A special report of the committee appointed to secure the passage of an act of the legislature regulating the practice of dentistry in the State of Mississippi was read and received, and the same committee, consisting of Drs. A. H. Hilzheim, R. J. Miller, and J. D. Miles, continued, and instructed to use every effort to secure its passage.

An essay by Dr. W. L. Stovall, of Winona, Miss., was read. Subect: "Want of Professional Honor."

Dr. Martin moved that a vote of thanks be extended to Dr. Stovall for his favor, which was adopted, and the secretary was instructed to notify him of the same, and to invite him to become a member of this association.

An essay by Dr. J. D. Miles, of Vicksburg, Miss., was read. Subject: "Professional Elevation."

The subject of "Dental Education" was discussed.

Dr. M. C. Marshall introduced the following resolution:

That a committee of three be appointed by the president of this association to prepare for publication a treatise on dental subjects, to be acted upon at their next meeting. Adopted.

A paper by Dr. G. C. Daboll, of Buffalo, N. Y.,—subject: "Pulp-Capping,"—was read.

Dr. Daboll recommended the preservation of the nerve by capping, in preference to destroying it, by using lacto-phosphate of lime or Fletcher's artificial dentine as a capping.

Dr. Martin thought the lacto-phosphate of lime, as received from the depots, was not good on account of evaporation of the lactic acid.

Dr. Hilzheim recommended Fletcher's dentine as superior to anything he had ever used for nerve capping.

Dr. T. O. Payne exhibited a specimen of nerve-canal filling with os-artificiel, the use of which he explained, stating that after the nerve had been thoroughly extirpated, the os-artificiel should be prepared carefully, mixing to the consistency of cream, allowing it to run thoroughly to every part of the canal. The specimen indicated success.

Dr. Hilzheim advocated small threads of cotton as a vehicle to convey the os-artificiel to the end of the root.

Dr. Martin recommended the use of small pieces of pure lead to be condensed into the nerve-canal,—he had succeeded well in this way.

The secretary was instructed, in sending out invitations next year for the annual meeting, to inform dentists that a code of ethics would be presented at said meeting for adoption; urging all members to be present to consider the matter.

The following were elected officers for the ensuing year:

President.—Dr. A. H. Hilzheim.

Vice-President.—Dr. W. T. Martin.

Secretary and Treasurer.—Dr. M. C. Marshall.

The president appointed as Executive Committee Drs. R. J. Miller, W. H. Marshall, and E. E. Spinks; committee to prepare a treatise on dentistry for public distribution, Drs. J. D. Miles, W. T. Martin, and A. Riser.

Dr. W. H. Marshall was appointed assistant secretary.

Drs. W. H. Marshall and M. C. Marshall were appointed delegates to the Southern Dental Association, which meets in Atlanta, Ga., August, 1878.

Drs. A. H. Hilzheim and J. B. Miles were appointed delegates to the American Dental Association.

Drs. J. B. Askew and E. E. Spinks were appointed delegates to the American Dental Convention.

Adjourned to meet at Winona, Montgomery County, in September, 1878.

M. C. Marshall, *Secretary and Treasurer.*

CONNECTICUT STATE DENTAL ASSOCIATION.

The annual meeting of the Connecticut State Dental Association convened at Hartford, Tuesday, May 15th, 1877.

There was much interest manifested by the gentlemen present, and measures were taken to improve the organization.

The election of officers resulted as follows:

President.—Dr. E. T. Payne, of Stanford, re-elected.

Vice-President.—Dr. L. Parmele, of Hartford.

Corresponding Secretary.—Dr. Daniel Dwyer, of Hartford.

Recording Secretary.—Dr. George L. Parmele, of Hartford.

Treasurer.—Dr. E. E. Crofoot, of Hartford.

Daniel Dwyer,
Corresponding Secretary.

NORTH CAROLINA DENTAL ASSOCIATION.

The annual meeting of the North Carolina Dental Association convened at Raleigh, Tuesday, September 4th, 1877.

After a harmonious and interesting meeting of three days, adjourned to meet at Charlotte, first Tuesday in September, 1878.

The election of officers resulted as follows:

President.—Dr. J. W. Hunter, Salem.
First Vice-President.—Dr. E. L. Hunter, Enfield.
Second Vice-President.—Dr. D. A. Robertson, Greensboro'.
Secretary.—Dr. W. H. Hoffman, Charlotte.
Treasurer.—Dr. J. H. Crawford, Raleigh.

W. H. Hoffman, *Secretary.*

BROOKLYN DENTAL SOCIETY.

The tenth annual meeting of the Brooklyn Dental Society was held Monday evening, October 8th, 1877. The following officers were elected for the ensuing year:

President.—O. E. Hill.
Vice-President.—A. H. Brockway.
Recording Secretary.—C. P. Crandell.
Corresponding Secretary.—W. H. Atkinson.
Treasurer.—F. W. Dolbeare.
Librarian.—C. E. Mensch.

BIBLIOGRAPHICAL.

Practical Hints on the Selection and Use of the Microscope. Intended for Beginners. By John Phin, Editor of *The American Journal of Microscopy.* Second Edition. Fully Illustrated, and Greatly Enlarged. New York: The Industrial Publication Company, 1877.

This little book, as we are told in the title-page, and also in the preface, is intended for beginners. "One great object in its preparation being the furnishing of a *cheap* manual for those who cannot afford the more expensive books of Carpenter, Beale, Frey," etc. If by "beginners" is meant those who neither desire nor expect to become microscopists, but to use the microscope as a means of amusement, the book will doubtless serve their purpose; but if the word is intended to indicate those who are seriously commencing the study of microscopy, we think they will find it to fall far short of their needs. Nearly all the subjects it presents are so much condensed that the treatment is too meager to be satisfactory, though, with few exceptions. the teaching is consistent with recognized authorities. Although the size of the volume necessitates the omission of much valuable information, there are some pages which might with advantage have been better used. Thus, the diagram of the frog-plate and the description of its use occupy three pages, while Holman's life-slide, which is far superior, and has taken its place in the examination of living blood, is not even mentioned.

In the preface it is stated that a list of the prominent manufacturers of microscopes and their addresses is given at the end of the book. We have failed to find any such list; and among those spoken of in the body of the volume, no mention is made of Zentmayer, whose variety of instruments excels that of any other maker, and whose reputation as a manufacturer is world-wide.

With the single further objection that the book is without an index, we are willing to allow that as a cheap manual nothing better has been published.

OBITUARY.

DR. NATHANIEL A. GLOVER.

Dr. Nathaniel A. Glover died of Bright's disease at Boston, Mass., September 1st, 1877, in his fifty-first year.

Dr. Glover was a member of the Massachusetts State Dental Society, and had practiced in Boston since 1860.

He was a gentleman, genial, sympathetic, honest, conscientious, and much esteemed by his patients. Through his death the grieved widow and children lose a kind husband and father and the profession a worthy member.

J. G. W. Werner.

DR. LUTHER PARMELE.

Dr. Luther Parmele died of hypertrophy of the liver, at Hartford, Connecticut, in the seventy-first year of his age. He was engaged in practice in Hartford for many years, and was highly respected and esteemed.

JUAN M. INCHAUSTI, D.D.S.

Died, in the city of Mexico, September 30th, 1877, from an accidental pistol shot at the hands of a boy, surviving only fifty-eight hours, Dr. Juan M. Inchausti, a graduate of the Pennsylvania College of Dental Surgery, class of 1877. He had opened an office in the city of Mexico only six days previously. A professional friend, writing of him, says, "Mexico has lost a man whose talent she is much in need of, and the alumni of the Pennsylvania College a member who would always have done her credit."

CELLULOID LITIGATION.

A DECISION IN THE CELLULOID SUITS.

We present herewith the decision of Judge Shepley in the test cases argued at Boston a year ago, to determine between the claim of the Goodyear Dental Vulcanite Company that dental plates made of celluloid infringed the Cummings patent and the claim of the Celluloid Manufacturing Company that such plates did not infringe.

It will afford great satisfaction to the profession to find that in relying upon the assurances of the Celluloid Manufacturing Company, that the question involved should be effectually tested, they have not incurred any unexpected liability, but, on the contrary, have a very explicit *judicial guarantee* that the celluloid base is beyond the reach of the Goodyear Dental Vulcanite Company's maintainable pretensions.

We congratulate our friends upon this conclusion of a vexed question, which has been a matter of great solicitude to a very large number of dentists (we understand, over fifteen hundred) who have actually been sued for using celluloid. Of course this decision is applicable to all such cases.

SAMUEL S. WHITE.

CIRCUIT COURT OF THE UNITED STATES,

DISTRICT OF MASSACHUSETTS.

IN EQUITY.

No. 729*a*.

Goodyear Dental Vulcanite Company

vs.

Charles G. Davis.

Same *vs.* Defendants in Sixty-Seven Other Cases.

OPINION OF THE COURT.

Shepley, J.

The patent and its reissues, granted for the invention of John A. Cummings of "an improvement in artificial gums and palates," or, as described in the claim, "the plate of hard rubber or its equivalent for holding artificial teeth, or teeth and gums substantially as described," have been the subject of extensive and prolonged litigation. Since the affirmance by the Supreme Court of the United States in

Smith, Appellant, v. *Goodyear Dental Vulcanite Company,* 3 Otto, 486, of the decree of the Circuit Court in the test case of *Goodyear Dental Vulcanite Company* v. *Smith*, the validity of the reissued patent has been fully established. The decision of the Supreme Court in that case must be considered as final, not only as to the validity, but as to the construction of the patent, which was carefully considered in that case, both in the Circuit and the Appellate Court, as it had previously been in the Wetherbee and the Gardiner cases.

In *Vulcanite Company* v. *Smith*, in the First Circuit, this Court decided that the patent was not for a process or art, but for the new product resulting from the manipulation by the described new process, and for one of those products in which the process so inheres that the described product can only be made by the described process, and that the invention was one in which the process by which it is made is a part of the substance, the thing made, the manufacture. What the new product was, and wherein the novelty consisted in the process, we shall hereafter have occasion to consider. In the opinion (by Mr. Justice Strong) in the Supreme Court in the same case, the invention patented is thus described: "The invention, then, is a product or manufacture made in a defined manner. *It is not a product alone separated from the process by which it is created.* The claim refers in terms to the antecedent description, without which it cannot be understood. The process detailed is thereby made as much a part of the invention as are the materials of which the product is composed."

If the defendants, by practicing the process described by Cummings, using the materials described by him, or such materials as are equivalents and were known equivalents at the date of his invention, in the described process, or such as, in the process, are mere substitutes of one material for another without any change in the process or in the effect, have produced a product the equivalent of his in the described properties, and for the described functions, then and only then, have they infringed.

The product, the new article of manufacture patented, was a set of artificial teeth, consisting of a plate of hard rubber or vulcanite, with teeth or teeth and gums, secured thereto in the manner described in the patent, by imbedding the teeth and pins in the vulcanizable compound, so that it shall surround the teeth and pins while the compound is in a soft state before it is vulcanized, so that, when the compound is vulcanized, the teeth are firmly secured by the pins imbedded in the vulcanite, and there is a tight joint between the vulcanite and the teeth. This product was a new product not alone because it substituted one material for another,—the material, vulcanite, rigid enough for purposes of mastication, yet pliable enough to yield a little to the mouth, and at the same time light and inexpensive, in place of the hard, unyielding, expensive, and heavy metals previously used,—but also in the additional fact that it was made by a process which, taken as a whole, was a new process, by the use of which process "the teeth can easily be baked into the gums, which form one piece with the plate."

The next question to be considered is, What was there new in the described process? The whole process of forming and making a set or case of teeth, including the plate, gums, and teeth, is fully described in the Cummings patent, and this process is so fully described in the case of *Vulcanite Company* v. *Smith*, that it becomes unnecessary to repeat it here. It is sufficient to state that in view of the state of the art there was nothing substantially new in that process until we reach this part of the description: "The teeth are provided with pins, projecting therefrom in such manner that the rubber which is to constitute the plate will close around them, and by means of them hold or secure the teeth permanently in position. The plaster mould, with the teeth adhering therein, as just described, is now filled with soft rubber, a little at a time, pressed in with the finger, or in any other convenient way; and care is to be taken that the rubber is made to completely fit into the cavities, and around the protuberances, including the pins, and is filled in to the thickness or depth desired to form the plate. I then lock the rubber plate in position by shutting the other half of the plaster mould over it to insure its retaining its exact form while warming, and then heat or bake it in an oven, or in any other suitable way. The soft rubber or gum, so inserted in the mould, is to be compounded with sulphur, rubber, etc., in the manner prescribed in the patent of Nelson Goodyear, dated May 6th, A.D. 1851, for making hard rubber, and is to be subjected to sufficient heat to vulcanize or harden it, substantially as directed in that patent. It is also to be colored in imitation of the natural gums, by mixing it with vermilion, or other suitable coloring matter, while in the soft state. After the plate has been heated sufficiently to harden it or convert it into hard rubber or 'vulcanite,' so called, the mould is removed and the plate is polished ready for use."

It will thus be seen that an essential element of the described product is "a plate of hard rubber or vulcanite," in which the teeth are imbedded, and an essential ingredient in the described process is the soft rubber or gum, compounded with sulphur, rubber, etc., in the manner prescribed in the patent of Nelson Goodyear, for making hard rubber, and that an essential step in the described process is the subjecting the compound of soft rubber or gum with sulphur "to sufficient heat to vulcanize or harden it, substantially as described in that patent" (*i.e.*, the patent of Nelson Goodyear, of May 6th, A.D. 1851).

The equivalent of that product thus made by that process must therefore contain the equivalent of the plate of hard rubber made and manipulated by a process equivalent to the described process of compounding a gum with sulphur and applying it and moulding it and incorporating it with the teeth and gums, when in a soft state, and then subjecting it to heat, to harden and vulcanize it in the manner described in the Goodyear patent, or in some equivalent manner, or by some equivalent process.

The defendants use, in making their set of artificial teeth, a plate made of "celluloid," substantially a new material, discovered and patented since the date of the Cummings invention. This substance is compounded of cellulose or vegetable fiber and camphor. No rubber or other equivalent gum, and no sulphur or equivalent for sulphur in the process, enter into its ingredients. It is not a vulcanizable compound, and contains no vulcanizing agents in its composition. The camphor in its composition, instead of being a vulcanizing agent, causes the composition to soften instead of harden under the influence of heat. The product, when compounded, and before being subjected to heat, is not soft, like soft rubber under like conditions, but hard. In the manipulation of this material, the process of making a set of teeth, composed of the plate and teeth and gums, is an entirely different process from the process described in the Cummings patent, when compared with that part of the Cummings process which was new in the state of art, and the novelty of which part gave to the Cummings process, when considered as a whole, the ingredient of novelty and patentability. It is not placed in the mould in a soft, plastic condition, "a little at a time, pressed in with the finger, or in any other convenient way," but in a hard, rigid condition, like horn or bone or ivory. It is then subjected to heat, not to vulcanize or harden, but to soften it. It afterwards, on being cooled or restored to its original temperature, returns to its original condition as a hard substance, as when first placed in the mould. No vulcanizing process, or even process of hardening by heat, and no equivalent for any such process, is practiced. In the light of these comparisons, it appears evident to the Court that the use of celluloid in the manufacture of sets of artificial teeth, as practiced by the defendants, and the manufacture itself, the set or plate of teeth, differ as much, both as to process and product, from the process and product described and claimed in the Cummings patent, as that process and that product differed from those previous manufactures which existed before the Cummings invention, and were unsuccessfully relied upon as anticipating it.

It is true that this construction of the Dental Vulcanite Patent narrows the scope of the patent. It is urged, with much force, that if this be the true construction, it would follow that if an inventor invented at the same time a new process and a new product, he would by such a construction of his patent lose the benefit of it, unless the infringer used his process or an equivalent one to produce his product or an equivalent one. One answer to this objection is, that in the case supposed the inventor might patent both the new process and the new product, and thus fully protect himself. In its application to this case, it is believed that the objection is without force, for the reason that such a construction of the claim of this patent is the only one which makes the claim a valid claim. To abandon the construction which makes the product patented the new manufacture, when made by the described process, is to abandon that which gives it its vitality. It is better to adopt that construction, which, although limiting the scope of the claim, secures to the inventor all that he actually invented and no more, than to adopt one which would render the patent invalid, or one which, being broader than the invention of the patentee, should be a barrier in the way of future progress in discovery and invention.

Bill dismissed.

PERISCOPE.

Composition of the Skull; Architectural Plan of the Skull; Study of Sections.—(*Concluded from page* 553).—Take next the sphenoid bone. In the adult this bone bears a striking resemblance to a bat with an extra pair of wings, but its name indicates that it is like a wedge.* It is not easy to perceive the common points of agreement between the sphenoid bone and a wedge, or between a wedge and a bat; so that possibly the name sphenoid refers rather to the position of the bone wedged in between the other cranial bones than to its actual shape. The parts corresponding to the parts in the bat are evident. The central portion is the *body*. The spreading lateral processes are the wings, and are called the *greater wings* of the sphenoid, to distinguish them from a smaller pair of processes, the *lesser wings* or *processes* of *Ingrassias* which jut out from the anterior part of the body. Projecting downwards on each side from the junction of the greater wings with the body, are two processes representing the legs, united in front, but separated behind, and called the *pterygoid processes, internal* and *external.* Curiously the term pterygoid means wing-like, and not leg-like;† the comparison to the bat not being carried out consistently in the nomenclature. The space which the pterygoid processes form behind is called the *pterygoid fossa.* The body of the sphenoid is hollowed out anteriorly into two cavities, called the sphenoidal sinuses, which underlie a depression on the upper aspect, called the *sella*

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* *σφὴν*, a wedge, and *εἶδος*, form.

† *πτέρυξ*, a wing, and *εἶδος*, form.

turcica or *pituitary fossa*, because it lodges a portion of the brain of great morphological but slight physiological importance, the *pituitary body*. The sphenoidal sinuses are bounded in front and below by two small ossicles, shaped "like sugar bags" (to use the comparison of Huxley), with their wide and open ends directed forwards, and their apices backwards. These ossicles are called the *sphenoidal spongy bones*, *cornua sphenoidalia*, or *bones of Bertin*.

Behind the sella turcica is a plate called the *dorsum sellæ* or *basilar plate*, and it bears at the ends of its upper border little tubercles called the *posterior clinoid processes*,* from some resemblance to bed-posts. In front of and opposite to them, and connected with the hinder border of the lesser wings, are tubercles which are called the *anterior clinoid processes*. The sphenoid bone, by means of the greater wings, forms the larger part of the middle fossæ of the skull, and stretching across the skull, bounds each orbit at the outer side, whilst contributing at the same time to the large fossæ behind and outside the orbits called the *temporal fossæ*, and to smaller fossæ below the temporal fossæ and zygoma, called the *zygomatic fossæ*.

By means of the pterygoid processes, it helps to bound the hinder openings of the nasal fossæ, and is clamped to the upper jaw-bones through the interposition of the palate bones. The sphenoid is distinguished by the important *foramina* which it contains, giving exit to nerves and blood-vessels. These foramina, or holes, are the *optic*, the *anterior lacerated*, the *vidian*, the *round*, the *oval*, the *spinous*, and *vesalian*. At birth, as you perceive, the sphenoid bone consists of these three pieces. In the center is the body joined to the processes of Ingrassias, bearing a marked resemblance to a dove with expanded wings, and on each side are the greater wings and pterygoid processes united. At an earlier period the body of the bone was divided into two parts, an anterior and posterior. The two pieces united about the seventh or eighth month, the line of union being "indicated for some time by a hole filled with cartilage round above, and opening interiorly into a wide notch." (Quain.) In scientific nomenclature, these two parts of the body of the sphenoid are termed the *pre-sphenoid* and the *basi-sphenoid*. The greater wings are called the *ali-sphenoids*, and the lesser wings the *orbito-sphenoids*, for they help to roof in the cavity of the orbit. The *external pterygoid plates* or *processes* are mere apophyses from the greater wings, but the *internal pterygoids*, though joined at birth to these two parts, are developed from separate nuclei, and represent distinct bones, the *pterygoid* bones of lower animals. The fœtal bone is not hollowed out like the adult bone, for the sphenoidal sinuses are not developed for many years after birth, but the spongy bones are represented in this specimen at least by separate little bony nodules. The parietal bones, with their two surfaces, four borders, and four angles, are extremely simple. On the outer side is the prominence called the *parietal eminence*, or protuberance corresponding with the point at which ossification commenced. The quadrilateral shape of the bone in the adult presents a contrast to the rounded fœtal bone. In the latter the parietal eminence is more prominent, and differs from the same part in the adult, in being the thickest instead of the thinnest part of the bone.

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* κλινη, a bed.

The adult frontal bone presents an upper and larger part, an expanded plain curvilinear plate, which is called the *frontal plate* or *vertical plate*, and protects the anterior part of the brain; and a lower and smaller part, divided by a notch into two very thin dome-like plates, which, roofing the orbits, are termed the *orbital plates.* The notch or interval between the plates is for the reception of the ethmoid, and is known as the *ethmoidal notch, or incisura ethmoidalis.* The orbital plates are united to the vertical plate by their anterior edges, and the line of junction is represented anteriorly by the upper margin of the orbit, or *supra-orbital arch.* The outer aspect of the vertical plate presents two rounded eminences, called the *frontal eminences*, exactly similar to the parietal. At birth the frontal bone is in two separate lateral halves, each formed from its own nucleus. The frontal eminences being the spots at which ossification commenced, are the thickest parts of the bones, whilst in the adult they are thinner than other parts of the vertical plate. Hollowing out the adult bone at the lower part of the vertical portion between the orbits, and above them, are the cavities called the *frontal sinuses.* Like the sphenoidal sinuses, they are not to be found in the fœtal bones. The ethmoid, or *olfactory capsule*, is divisible into a *horizontal plate* known as the *cribriform*, from the perforations for the olfactory filaments, twenty on each side,—a *vertical* or *perpendicular plate*, the upper part of which appears in the anterior fossa of the skull as the *crista galli*, and the lower or larger part in the nose assisting to form the *septum nasi*,—and two lateral portions, or *lateral masses*, suspended as it were from the shoulders of the cribriform plates, more or less after the manner of milk-pails. In botanical language, the lateral mass is *sessile*, while the milk-pail is *pedunculated.* The *lateral masses* are again divisible into two *spongy* or *turbinated bones*,—the *ethmo-turbinals*, which are clothed with mucous membrane, to which the olfactory filaments are distributed. These bones lie at the upper part of the nasal cavity or nasal fossæ on each side, which is the region devoted to the olfactory sense. The whole of the lateral masses are composed of little cavities or air-cells, which communicate with the nasal fossæ. The outer walls of these cells is a thin plate of compact bone, the *os planum*, which forms the main part of the inner wall of the orbit. At birth the ethmoid consists of two osseous masses, not hollowed into cells, but corresponding to the lateral masses, the horizontal and perpendicular plates being still cartilaginous.

The main divisions of the temporal bones are the *squamous*, the *zygomatic*, the *mastoid*, the *petrous*, *tympanic*, and *styloid.* The *squamous* portion, or *squamosal*, is the thin plate which overlaps the parietal at the side of the skull, and bears the process called the *zygoma*, by which the temporal joins the malar. Underneath it presents the *glenoid fossa* for articulation with the lower jaw.[*] Between the *squamosal* and the *mastoid* is the orifice of the external passage of the ear. The process descending behind the orifice of the ear is the *mastoid process*,[†] so called from its shape, which is the shape of a nipple. It is in serial line with the transverse processes of the vertebræ. Jutting into the skull, between the squamous and mastoid portions, is the true bony case for the organ of hearing,—the *petrosal* or *petrous portion, pars petrosa.* Triangular and wedge-shaped, its apex abuts against the sphenoid, its base is inserted between the mastoid and squamous divisions of the bones, and two of its three sides, anterior and posterior, appear in the cavity of the skull, the third or inferior lying at the base. Of the three borders the superior is a conspicuous eminence in the interior of the skull. Bounding the outer passage of the ear, anteriorly and inferiorly, is a plate of bone known generally as the *auditory process,* but better styled the *tympanic bone*, as it attaches the *tympanic membrane*, which separates the external passage from the middle division of the ear or *tympanum.* The long process which descends from the petrous portion *surrounded* at its base by a prolongation of the tympanic bone, called the vaginal process, is the *styloid process.* The other more conspicuous objects, in the petrous portion of the bone, are the aperture on the posterior surface for the auditory and the facial nerves, the *internal auditory foramen;* the bent canal, which opens both at the apex and on the under surface for the internal carotid artery, the *carotid canal;* and a depression outside and behind it for the large internal jugular vein. At this spot the temporal unites with the occipital to form the *posterior lacerated foramen* already noticed. At birth the temporal bone consists of two or three parts; the squamosal and zygoma are joined to form one part,—the petrous and mastoid to form a second,—the auditory process, an incomplete ring or hoop of bone, open above for the membrana tympani, is the third, but the tympanic is often united by its extremities to the squamosal. The styloid process is still cartilaginous. The petrous and mastoid portions of the temporal bone are formed from three chief ossific centers, named the *prootic*, the *epiotic*, and the *opisthotic*, which together constitute the bony case for the auditory organ, or the *periotic* capsule.

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[*] *γληνη*, a shallow pit.

[†] *μαοτσς*, a teat or nipple.

The superior maxillary bones have marked features. The main part, or *body*, is hollowed out into a great cavity, the *antrum of Highmore*, or *maxillary sinus*, which lies beneath a thin plate of bone, forming the floor of the orbit, above the outer or hinder portion of the curved process, called the *alveolar* process, which bears the sockets for the bicuspid and molar teeth, outside a thin, imperfect plate of bone forming the outer wall of the nasal fossa, behind the plate of bone which intervenes between it and the soft structures forming part of the cheek, and in front of the rounded posterior surface. Separating the surfaces of the body is a process known as the *malar process*, for junction with the malar bone; rising upwards is the *nasal process*, part of the fundamental osseous frame-work of the nose; passing inwards is the *palatine plate*, incomplete behind, to form part of the floor of the nose and the roof of the mouth. A cavernous body with three surfaces and four processes is the superior maxillary bone. Conspicuous on the anterior surface is the hole below the orbit, called the *infra-orbital foramen*, and conspicuous on the inner surface are the ragged orifice of the antrum and the moiety of the *nasal duct* for the passage of the tears into the nose which lies behind the nasal process.

All the parts of the maxilla are recognizable at birth. At this period it may be observed that the part of the alveolar process bearing the incisor teeth, with a small triangular slip of the palatine process behind it, shows some evidence of having been originally a separate ossification. A fissure may be found running backwards and inwards from the interval between the canine and outer incisor and across the alveolar and palatine processes to a foramen called the anterior incisor foramen, which lies behind the inner incisor. This part of the maxilla is known as the premaxilla, premaxillary, or intermaxillary bone. It is well seen as a separate bone in lower animals, as exemplified in this tiger's skull. The two premaxillæ are seen to bound the anterior opening of the nose, but the antrum is a mere dimple on the inner wall, and the alveolar process is a shell consisting of two thin plates imperfectly divided by slender septa into *alveoli*, or sockets for the teeth.

The palate is distinguished by its resemblance to a capital L. It consists of two plates, a *horizontal* or *palatine*, which unites with its fellow to complete the partition between the mouth and nose where the corresponding process of the superior maxillaries are deficient, and a *vertical plate* which bears at its summit two processes, the *orbital* and *sphenoidal*, separated by a notch or incomplete *foramen*, the *spheno-palatine.* These two plates join each other at a right angle, and prolonged downwards from the posterior edge of the vertical plate is a rough pyramidal process, the *tuberosity*, which fits in between the divergent ends of the pterygoid processes of the sphenoid. At birth the palate bone is small, but its several parts are distinct.

The *vomer* is a thin bone, with two surfaces and four borders attached above to the sphenoid, and below fitting in between the palatine processes of the superior maxillary and palate bones. It helps to form the septum nasi. It is in reality composed of two plates of bone united together, as is well indicated in the fœtal bone by the deep groove on the anterior border which separates them from each other.

The inferior turbinated bones are in the form of a scroll, and hang on by a depending leaf-like process to the cavity of the antrum. In the fœtal bone all the parts and processes of the adult bone are recognizable.

The nasal bones, with two surfaces and four borders, elongated, narrow, and stout, form the bridge of the nose. They are grooved internally for the nasal nerve. The delicate lachrymals, quadrilateral in shape, are chiefly distinguished by the ridge and groove on the outer aspect for the completion with the superior maxillary of the *lachrymal sac* and *nasal duct.* The malar bones are more irregularly quadrilateral, having a body with four prominent angles, and bearing a process which projects to form part of the floor and outer wall of the orbit. It is remarkable for its strength, the obliquity of its position, and the efficient manner in which it clamps the temporal and frontal to the superior maxillary, thus serving as a bond of connection between the cranium and the face, and justifying the synonym *jugal* bone. With the zygoma it forms a narrow bridge over the temporal fossa. There is no special feature to be noticed in the fœtal nasals, lachrymals, and malars.

The lower jaw-bone forms a horizontal arch, suspended, by two vertical branches which join it at right angles, from the temporal bones. The arched middle portion is called the *body*, the vertical branches the *rami.* The body carries, above, the *alveolar process* with sockets for the teeth, and, below, ends in a thick border, the central part of which is everted to form the osseous basis of the *chin.* Each ramus bears two processes on the upper border; behind, the articular process or *condyle*, which plays in the glenoid cavity of the temporal; in front the triangular apophysis called the *coronoid process;* the condyle and coronoid process by a notch called the *sigmoid notch.* The junction of the posterior border of the ramus with the lower border forms the *angle.* Body, rami, condyle, coronoid and alveolar processes, angle and mental process or chin, are the main parts of the lower jaw. At birth the bone is in two equal halves, united by fibrous tissue. The two pieces become joined in the first year, and the place of junction is termed the *symphysis.* This completes our preliminary sketch of the separate bones of the skull, as well as the present lecture.—*Lectures on Human Anatomy, Descriptive and Surgical, by Walter Rivington, M.S. Lond., etc., Surgeon to the London Hospital, etc., in Medical Press and Circular.*

NECROSIS AND FISTULA.—Fistula in the cheek is sometimes a very troublesome sequel to disease or injury of the jaw, and is not only often difficult to heal without operation or the local application of caustics, such as the actual cautery, but is extremely obstinate, a very long time being often necessary to effect a permanent cure. The following case, as will be seen, was treated in a very simple manner, and completely healed in a short time.

A man presented himself in the out-patient room with a fistulous opening in his face just opposite to the lower canine tooth of the left side, through which the saliva flowed, and whenever the lower lip was moved the saliva passed out in jets. It appears that a few years previously he had experienced some clumsy dentistry, and had as a result necrosis of the lower jaw, with an abscess afterwards, which opened through the face. On passing the probe up the sinus, which had the caliber of a crowquill, it took an oblique course, nearly an inch in length, upwards and backwards. Mr. Bellamy adopted the simple expedient of introducing a small crystal of nitrate of silver into the sinus, and leaving it there, as he has been in the habit of doing with troublesome penile fistulæ. At first the nitrate caused a considerable amount of discomfort and pain, but after two further applications of the salt, at intervals of a week, the canal healed completely, and a small depression was all that could be seen indicating the original position.—*Charing-Cross Hospital Reports, in Lancet.*

SUB-PERIOSTEAL SURGERY.—At the Congress of German Surgeons in Berlin, in April, the president, Professor von Langenbeck, showed to the society some specimens of sub-periosteal surgery, which Professor James R. Wood, of Bellevue Hospital, New York, had expressly sent over to the Congress by his house surgeon, Dr. Wiggin. The object of chief interest was an inferior maxilla, which had been completely regenerated after excision. The patient was a young woman, eighteen years old, who suffered from phosphoric necrosis of the lower jaw, the result of working in a match-factory. The whole inferior maxilla was affected, and the entire bone was removed sub-periosteally at two separate operations. The patient made a good recovery, and returned to her former occupation, but died three years later from cerebral abscess. Dr. Wood was fortunate enough to obtain the whole skull. The new maxilla was small, but complete and symmetrical, and must have proved of great benefit to the patient. By the side of the preparation the necrosed jaw which had been removed was displayed. The president stated he had operated in four cases for phosphoric necrosis of the inferior maxilla, and showed specimens and photographs of patients in whom the bone had been re-formed. These cases proved that the newly-produced jaws remain, although it was an admitted fact that in sub-periosteal excision of the superior maxilla there was only slight new osseous formation. He thought that if the whole inferior maxilla was to be taken away, it was better to do so by two operations rather than by a single one, as, if the jaw is removed altogether at once, retraction is apt to follow.—*Medical and Surgical Reporter.*

HINTS AND QUERIES.

"He that questioneth much shall learn much."—BACON.

CORRESPONDENTS desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

WILL some one give me cause and remedy for gold fillings changing color in some cavities?—A. W.

CAN any one give me his experience in the use of disks and retainers for fitting plates to gums which have been very much absorbed?—B. S.

WILL some one furnish the best method of treatment to pursue in cases of tumid gums and surrounding parts, caused by the presence of pus at the apex of the root, from a diseased pulp? Can any harmful consequences follow the removal of a tooth at any stage of such a condition? Usually, in affections of this sort, I advise the application of a split raisin or fig, roasted, to the gum opposite the seat of the disease, to hasten a discharge, but oftentimes this treatment proves ineffectual because of the difficulty in keeping the application in position a sufficient length of time to produce the desired result.

Any advice on the above-named points will be much appreciated by WEBB.

WHAT is the best treatment for teeth that are sensitive, at margin of gums, when any thing sweet or sour is taken into the mouth?—S. B. COOK.

I WAS called upon to mend a celluloid plate (replace a tooth), and not wishing to use celluloid in repairing, I thought I would *experiment* with rubber and see its action. I dovetailed, drilled, and proceeded as for rubber, vulcanized; but on removal from flask I found *no celluloid plate left to tell the tale*—the rubber was all right. Rubber can be mended with celluloid; why cannot celluloid be mended with rubber? Will some one explain the chemical difficulty, or give any other reason, if any?—I. M. W.

IN reply to J. H. A., who queries in October number of DENTAL COSMOS, would say there is *no* remedy other than to construct a *properly-fitting* plate. As long as the plate in question is worn, the pathological condition will exist. The first step in the treatment of such a case is to remove the exciting cause, after which nature will effect a cure of her own accord.—F. F. DREW, D.D.S., *Baltimore, Md.*

IF not too late, would recommend "Dens," who inquires, in September number of DENTAL COSMOS, "the manner of inserting lower plates when little or no ridge exists, and the best material to use," to take an accurate impression in plaster of Paris and use "Weston's metal" as a base (for description of which see Harris's "Principles and Practice of Dental Surgery," page 656), the idea being to procure a material sufficiently heavy to rest firmly upon the jaw and resist the action of the muscles of mastication.—F. F. DREW, D.D.S., *Baltimore, Md.*

ANSWER TO DENS.—Take a good plaster impression; from it make a true model, being careful to make a perfect fit of ridge. Leave your plate no wider than necessary, and you will have no further trouble, no matter what material you use (unless you are working for a very fussy patient).—S. R. DIEFFENBACHER, *Butler, Pa.*

REPLY TO W.—To prevent discolored joints in rubber cases, remove all wax, using hot water if necessary. Place between the joints, first, a drop of water, followed by *thinly* mixed plaster. This is best accomplished by means of a *very small* thin spatula made of an excavator. This treatment, with ordinary pressure, never fails.—W. H. R.

ANSWER TO F. F. DREW, D.D.S. (A Case in Practice).—The anatomical relations existing between the nerves of the teeth and the ear are very intimate.

The ear receives one branch directly from the maxillary nerve, which supplies the lower teeth. It receives another from the glosso-pharyngeal, which supplies the posterior portion of the mouth and tongue. It gets three branches from the facial nerve, which supplies the cheek, and whose fibers are most minutely interlaced and mingled with those of the upper maxillary, which, also, supplies the upper teeth; and besides this, the facial nerve, or portio dura, lies in part of its course in direct contact with the nerve of hearing, forming a union so intimate that they were long regarded as only different portions of the same nerve. It results from this anatomical arrangement that there is a most intimate sympathy between the teeth and the ear, and excruciating pains in the ear are a frequent consequence of disease in the teeth.

Extract the tooth, and your patient will doubtless recover permanently.—L. D. C.

REPLY TO E. T.—Permit me to suggest to E. T. a plan which I think will obviate the difficulty he has in vulcanizing rubber, namely, "a space between the teeth and plate after it is vulcanized." I believe it is not on account of the want of cleanliness, or the neglect to remove everything from around the pins, but in the manner in which he packs his rubber. If he will, after removing every particle of wax and plaster, and anything else that may fall in from the pins, and cut his rubber into strips, say one-sixteenth of an inch in width, warm and pack them in well between the pins and the teeth until full, then use somewhat larger pieces for convenience until the packing is complete, then put the flask together and put it in boiling water for say five minutes, then close up entirely, he will have no more separating of teeth and plate.

P.S.—After packing, do not close the flask up entirely until after boiling in water, as above stated.—W. J. HIGGINS, *Fayetteville, Tenn.*

E. T. SAYS "blocks are often loose, and single teeth nearly always so," etc. The trouble is, the remedy he should try he has left out,—that is, put in more rubber so as to use a considerable force, after heating, to bring the flask together, and do not make the waste groove or gate too large, so that it may take off the pressure from the rubber when it ought to be closely confined. We never had the difficulty E. T. complains of only when we did not put enough rubber in flask.—E. O.

ANSWER to E. T.—Perfect *cleanliness* in *every* respect must be observed in rubber-work; when this is observed *pure* rubber never detaches itself from the teeth or pins —F. H. B.

ANSWER to COUNTRY.—Details of finishing gold fillings after condensing cannot be given *satisfactorily* through the medium of this journal, but can best be obtained from a good preceptor or from some good dental college.—F. H. B.

IF M. M. J. will apply a small horse-shoe magnet or a small nerve-instrument charged with electricity to the mouth of the pulp-canal, he will probably see the point of his broken instrument hop out as though it had life in it.—ZEKE.

PERMIT me to say to Prof. Essig that had I known that he was braced up by careful and intelligent men, I might not have questioned his position; but he gave it as his humble opinion that "no one ever experienced the physiological effect of mercury in consequence of the presence of vermilion in artificial dentures." This was the only point I criticised; admitting that non-conducting substances, uncleanliness, etc., might cause inflammation of the tissues of the mouth. Now, I have not said, nor would I say, that there is nothing besides vermilion that would cause abnormal conditions of the mucous membrane. Dr. Essig, in his first article, says that "the abnormal condition of the tissues of the mouth, so often seen in cases where vulcanite is worn, is due, first, to non-conducting substances; second, to want of cleanliness" And in reply to me, says, "The inflamed condition of the tissues of the mouth was met with, in connection with any of the bases in use,"—before it was vulcanite,—showing it is not caused by non-conducting substances only, for silver is the best conducting substance known. So now uncleanliness only is left to account for the trouble when vulcanite is worn. Now, is the doctor sure that the severe cases of inflamed mouths from wearing vulcanite are not different from those from wearing other bases?

I have never seen nor heard of porcelain, continuous gum, gold, silver, or celluloid dentures causing such *severe* cases as when vulcanite was worn, unless it was when gold or silver had been very much alloyed. If the professor has any *facts* on the case, let them be produced; for *one* fact is worth more than a thousand theories. It is humiliating to have one appear so ignorant as not to know that the coloring material in celluloid is vermilion, when any one reading Prof. Essig's first article would be so informed, if he had not known it before. There is about as much difference between the quantity of vermilion used in vulcanite and celluloid as there is between the practice of extreme allopathists and homœopathists; and if *similia similibus curantur* be correct, the vermilion in the celluloid would cure the effect caused by that in the vulcanite. It is said that thirty-six parts out of one hundred of vulcanite are vermilion and only one part in four hundred in celluloid, so that unless one is a firm believer in the infinitesimal theory, the vermilion in celluloid cannot do much harm, although it may do some. The professor evidently misunderstood my meaning of catalysis. I did not mean to be understood to refer to contact of the vulcanite with the mucous membrane, but that the vermilion in the vulcanite, coming in contact with the tissues, acted as a *catalytic agent* in producing the inflamed tissues. He says *catalysis* does not mean contact; admitted But will he please explain how catalysis can be produced without contact? Dunglison says catalysis is that which "resolves other bodies into new compounds by mere contact or presence." Thomas says, "A force or power which decomposes a compound body by mere contact."

My reasons for believing that vermilion acts as an irritant or poison in vulcanite are these:

Chewing a piece of unvulcanized red rubber for half an hour produces the sensations so often described by those who have suffered from wearing vulcanite. I made a lady an upper set of teeth on black vulcanite, but used pink rubber for the "gum part" of the denture, and wherever the pink rubber came in *contact* with the tissues that part was inflamed, but where the black rubber touched there was no inflammation. Besides, I have heard "careful and intelligent men" say they had seen the same thing. Also, when the red vulcanite has been replaced by black vulcanite or celluloid, recovery has followed. If the professor can give stronger testimony in favor of vermilion, I will not accuse him (because he does not agree with me) of being "disposed to shelve so important a subject as the one in question," but will join him in endeavoring to get at the bottom facts of cause and effect.—C. R. **Taylor**, *Streator, Ill.*

Dr. F. F. Drew's "Case in Practice," in the August "Hints and Queries," brings to my mind a similar case. Some time during last June a girl ten years of age was brought to me by her father to see if I could ascertain what was the trouble with her face, which was swollen on the left side. On examining the mouth, I found an abscess on the sixth-year molar of the left lower jaw. The father stated that two different physicians had treated her for scrofula for *three years.* The left side of the face during that time had been paralyzed, more or less. The ear of the same side had ached continually, but I cannot say whether there had been any discharge or not.

The tooth was removed, and my prognosis was that there would be a complete recovery. I saw the father one week after removing the tooth. He said the girl had not been as well during the three years; and in August he said she was entirely well.—C. R. **Taylor**, D.D.S., *Streator, Ill.*

Amalgam.—Notwithstanding the fact that amalgam is beginning to be appreciated, and is fast taking a higher position (and deservedly so) as a material for the filling and preservation of the teeth, by far too many, both dentists and patients, it is regarded as a *cheap filling.* Now, the fault does not lie so much in the material (if good) as in the operator; but it is not strange that in the hands of those operators who *do* regard it as a *cheap filling* it should prove unsuccessful. I believe that amalgam has never had anything like a fair test at the hands of those who *do* use it when they *cannot* use gold. Those who seldom use amalgam, and who consider it of but little account, are not generally the ones who are the most faithful in the use of it. To obtain good results with any material, we must be thorough from the beginning to the end, from the first cut of the excavator to the final polish; and when the same care is taken in all details, with an amalgam filling as with gold, then only will it show its real value. Now it falls to the lot of some of us to be located in places where to many it is amalgam or nothing. I know it is often advised by some to use gold in all cases, and give to the patient the extra expense (above what amalgam would be). This sounds well and has a good ring apparently, but I have never yet seen or known an operator to do this to any extent; were this done, there are those who would take advantage of it, and some that would come to us would become suddenly straitened in circumstances.

The better way would be to understand amalgam and be faithful in its use, and if we find that it is a good thing, charge not for a cheap filling but for a filling that saves the tooth. We have a great deal of poor tooth-structure to contend with, and the indiscriminate filling of all teeth with gold shows poor judgment. If by using amalgam or any other material intelligently and with skill we save teeth that with gold would perhaps be a failure, it is no more than right and just that we should charge, as I said before, for a filling that saves the tooth. So that the more general use of amalgam would not affect the use of gold nor our practice, as some who denounce it claim. I believe that if those who conscientiously feel that amalgam in many instances will save teeth better than gold would charge more for their time and labor, it would give to it a higher position, and it would be regarded by patients as of more worth than it is from being used carelessly, and in charging for a *cheap filling* (as it really is in many instances, from the manner of using). If amalgam is used at all, there is an object in doing so, and the old saying, "What is worth doing at all is worth doing *well*," comes in here with as much significance as elsewhere; and when teeth are *filled* with amalgam, instead of being *daubed* with it, then this material will come to the front.—FRANK H. BRIMMER.

APPLIANCE in treatment of cleft palate. Take an impression of the parts and fit a *thin* plate *before operating*. The plate will protect the parts and keep them in proper place; prevent rupture from coughing or other motions, and keep the food from irritating the wound; enable healing by first intention to take place with less inconvenience to the patient than usually attends such operations. It is especially useful for young patients in accustoming them to something artificial in the mouth, as well as serving to prevent enlargement of the fissure.

Such a plate is of great assistance in retaining applications in cases of necrosis, caries, and other diseases of the gums and palate, besides keeping them clean and free from motion, to say nothing of the beneficial effect of gentle pressure in many surgical cases.—S. BALL.

TRANSPLANTATION.—On the 14th of May last I inserted a right superior central incisor, which had been extracted for more than a year, into an alveolar socket from which I had just extracted a like tooth for another patient. The tooth still remains firm in the socket, and the patient tells me that he does not know any difference between that and his other teeth.—E. H. LOCKE, *Troy*, *Alabama.*

HOW AMALGAMS ARE MADE.—The following item of information, which will be new to many of your readers, I copy from editorial replies to correspondents in *The Chemist and Druggist.*—M. T.

"G. E. B.—We believe dentists are pretty well agreed that no stopping for teeth equals pure gold. Amalgams are made with mercury and gold, or silver, or tin. To make it, gold (if that metal be employed) is heated in a crucible, and enough mercury added to render the amalgam of a doughy consistence at the temperature of boiling water. When cold, any excess of mercury can be pressed out in a piece of chamois leather. The amalgam is used hot after a little kneading in the hand."

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE

[Entered according to Act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the office of the Librarian of Congress at Washington.]

(Continued from page 566.)

IN single-rooted teeth the cavity of decay, or the tap-hole (as may be), should then be temporarily filled, either with cotton touched to solution of gum sandarac or with gutta-percha, and should so remain (ordinarily) for one week.

NOTE.—At the suggestion of my friend, Dr. Benjamin Lord, I have been using for the past few months a solution of gum sandarac flavored with a mixture of oil of cinnamon and oil of cloves (equal parts); the oils are cut in the alcohol and the gum then dissolved.

By this means a very agreeable flavor is substituted for the disagreeable taste of the ordinary sandarac varnish, and patients express decided approval of the modification.

In multi-rooted teeth the operation of preparing another canal is next in order.

It is, that in drilling and cleansing other portions of the pulp-cavity and other canals, the cotton dressing of the prepared canal shall not be disturbed, that directions have been given not to permit the cotton to fill the canal to its mouth; and it is with a view to the most methodic preparation that it is suggested to extirpate from the largest canal first, then from the next in size, and thus leave the smallest until the last.

This mode of procedure will secure against re-entrance of *débris* into cleansed canals, and permit of the medication of such canals as are too small to admit of anything more than the finest hair-probes, as a *last act* prior to the temporary stopping of the tap-hole.

This has just been alluded to under the head of single-rooted teeth, but I would here add the injunction to *neutralize the acidity* of the solution of salicylic acid (if this excellent medicament has been used as a canal-dressing) by introducing from a blunt probe a drop of *aqua ammoniæ* or *phénol sodique* into the tap-hole, before closing it with the cotton and solution of sandarac stopping.

Without this precaution the surplus salicylic acid which remains in the *bulbous* portion of the pulp-cavity, and in the cavity of decay, or in the tap-hole, will, to a certain extent, act upon the dentine and so decalcify it as to permit of an early incipiency of decay around the permanent stopping, particularly if this be made of metal instead of gutta-percha. I have intimated that a tooth upon which the operation of extirpation of the pulp has been performed should *usually* remain about a week before the permanent filling is introduced.

While discussing the action of arsenious acid, and denying the doctrine of apical irritation through normally-formed canals, I distinctly stated that *an irritation* was liable to occur, and indeed did *almost always* occur in greater or less degree, which irritation was *due* to the death of the ultimate canal portion of pulp-tissue (and would occur in that connection, whether arsenic or *any other* irritant, *vital*, *chemical*, or *mechanical*, was the devitalizer), and was the *concomitant* of *recuperative* effort in the establishment of comparative normality in the parts surrounding the apex of the root, and *was not* an indication of further trouble, requiring further treatment for its alleviation.

I may be pardoned for referring again to this subject, on account of its importance, and on account of the directly opposite teachings which have for so long a period been given, and still continue to be given, by the accepted text-books.

In antagonism to these teachings I have insisted that *rest* shall be given to the parts; that this recuperative process shall not be interfered with; that *thus* (instead of by medication) the natural healing may be accomplished, and the best possible condition that circumstances will permit be established.

It is, however, now necessary to state that this "waiting" is governed by the same rulings as have been found pertinent to all conditions discussed.

The same great latitude of practice is not only permissible but advisable, in this as in every operation in dentistry; but, equally with all others, it is governed by definite local and systemic conditions, and systemic peculiarities.

Just in proportion as irritation is slight and recuperative power is sufficient, so is *delay* in the completion of an operation *unnecessary;* and, inversely, just in proportion as irritation is excessive (announced by tenderness upon pressure, continued inability to use the tooth, with more or less constant knowledge of the presence of the organ) and recuperative power is feeble and insufficient, so is *delay* in the completion of the operation a matter of *absolute necessity.*

Thus it is that while, for usual practice, the recommendation is given that a week be allowed for the healing of the surrounding parts after pulp-extirpation, prior to the completion of the operation, it is nevertheless true that it is frequently proper to perform extirpation and filling of pulp-cavity and cavity of decay or tap-hole at *one sitting;* and as frequently equally proper to permit a period of time much greater than that indicated as "usual" to elapse before venturing upon final filling.

So extended is this latter deviation that it is not unfrequently judicious to permit two, four, six, or eight weeks to pass before permanently stopping a pulpless tooth; and, as will be shown in the discussion of chronic periodontitis, this condition is sometimes the unavoidable, almost immediate, sequence of pulp-extirpation, in which cases teeth may remain for *years* reasonably useful, and yet may *never* be *permanently* filled.

It has sometimes been taught that the immediate or postponed filling of a pulpless tooth is markedly in consonance with the absence or presence of hemorrhage at the time of pulp-extirpation.

I must dissent from this opinion, at least in part, for while it is decidedly improper to fill a canal into which blood is oozing from wounded vessels, it is also true that in many instances of most decided resistance to permanent stopping there is not only no existent hemorrhage, but, on the contrary, only the most deliberate possible *undue* effusion.

So slowly does this process go on that no moistening of cotton or bibulous paper canal-dressings affords that diagnostic sign of its presence in less than from two or three to forty-eight or sixty hours, or *even more.*

Moreover, *except in cases of hemorrhagic diathesis*, I regard the fact of hemorrhage as a usually favorable indication for comparatively early possibility of permanent filling, even though it precludes the *immediate* performance of the operation; for, in ordinary bleeding, there is the ordinary cessation of bleeding with its complete coagulation and prompt organization, precisely the same as is found in ordinary wounds, scabbing, and healing with scar.

But while I dissent from the view that the absence of hemorrhage is a clear and safe guide for immediate filling after pulp-extirpation, I nevertheless recognize that, in connection with good systemic and temperamental attributes, and the allowance of sufficient time for thorough devitalization and almost complete (or better, complete) separation of pulp-tissue from outside tissue, by sloughing, the absence alike of sensation and of hemorrhage, concomitant with the withdrawal of the canal portion of pulp *entire*, is as favorable a condition for successful immediate stopping as can be obtained.

There is one point of which I would speak in connection with pulp-*withdrawal*, viz.: a danger which exists in *direct* drawing out of canal portions of pulp, particularly from large round canals of single-rooted teeth, from the palatal canals of superior molars and the distal canals of inferior molars; this is, a liability to injure the true *nerve*-filament outside the apical foramen.

Direct traction will sometimes so stretch the continuation of pulp-vessels and nerve just outside the foramen as to cause their laceration at a point rather *outside* than just *inside* the cemental covering of the root; retraction of these occurs as the immediate sequence of laceration, and a resultant irritation frequently ensues which is exceedingly annoying and difficult to control.

For this reason, separation or excision of the larger pulp-filaments by a *rotary* motion is especially advised.

It will be noticed that free openings, easy access to pulp-cavities, and particularly canals, soothing and cleansing medication, thoroughness in extirpation, gentleness in manipulation, and thoughtfulness of the need for *time* on the part of the life-force to do its healing work, constitute the principal points which, in my experience, are the *essentials* to be recognized in connection with the operation of pulp-extirpation.

I eschew all *attempt* at *impossibilities;* all cleansing of canals by irritant or escharotic medicaments, as creasote, chloride of zinc, etc.; all painful irritation, such as probing and hooking at still vital pulps; all *experimental* haste in the completion of the operation by immediate filling, and all possible irritation during the introduction of the filling when it is finally introduced.

It is in this latter connection that I regard the practice of filling the cavity of decay immediately upon the obtunding of the bulbous portion of pulp-tissue, before the supervening of any perceptible external irritation, or any absolute presence of decided abnormality, and the reliance upon the tap-hole as the medium for all "treating" work, as well worthy *much more frequent consideration than is generally given it.*

As the result of many years' practice and an unusually large experience, I have found that my results warrant this conclusion.

Teeth so treated average *as well* (I have reason to believe, *better*) as those in which the cavity of decay is the usual route by which extirpation is attempted; and when, as is frequently the case, the local and systemic changes incident to the passing of five, ten, or twenty years of life necessitate that relief shall be afforded those dental organs which have for so long a time done duty on *half allowance* from vitality, *then*, *if never before*, the great advantage of a tap, through which the desired comfort is quickly and *easily* obtained, is almost constantly demonstrated.

That these necessities for re-treating are not *peculiar* to the practice I advocate, I wish most distinctly to assert, for my records show that of the many *thousands* of teeth which I have treated, more than *one-third* of the number have been cases of re-treatment coming from other hands. In so large a proportion of these cases, as that I may say *nearly all*, relief has been afforded by the making of a tap-hole and the subsequent removal of canal fillings which it was *impossible* to make any more thoroughly than had been done from the point of ingress, or by means of which ingress to canals was afforded which had been of necessity overlooked, from the impossibility of seeing them.

As will be shown in the discussion of periodontitis, even when canals are perfectly cleansed and perfectly filled with the most generally approved materials, *trouble may come*, and it will be found that, while operators may with great composure suggest that there is "nothing inside the tooth to give trouble," and that the existing difficulty can be relieved by "perforation of the alveolar process," patients would generally *prefer* the removal of a tap-plug and canal filling to the operation of drilling into their jaw-bones!

Pulsating Pulps.

In connection with the treatment for pulp-devitalization, there is *one peculiar condition* which is so markedly different from the various ordinary conditions which can be spoken of in terms, and treated in ways which may be called *average*, that I deem it necessary to allude to it under this special heading.

It is occasionally found that with every *apparently* reasonable condition for success existing, an attempt at pulp-conservation fails most signally.

In despite of *reasonably* hopeful prognostications, the most discouraging sequelæ very promptly supervene.

No *ordinary* uneasiness, no *ordinarily* sharp *but evanescent* "darts" or "twists" of pulp dying, follow the operation of capping and filling, but *decided pain*, *long-continued paroxysms of severe suffering*, *throbbing pain*, and *imperative demand for relief* are the equally strange and unwelcome results of our efforts.

If counter-irritation by means of capsicum, aconite, iodine, etc., applied to the gum over the tooth is resorted to, and the usual systemic soothing by means of assafœtida, opiates, etc., is conjoined, and all this additionally aided by that derivation which results from drastic purgation, or, if the various accepted remedies of homœopathic and botanic medication are indulged in, a comparatively short course is run, which eventuates in *soreness of the tooth upon pressure,* generally with its accompaniments of *throbbing* or *pulsation* in greater or less degree, and more or less continuous.

As has been frequently intimated, this *soreness upon pressure* is usually concomitant with the irritation, almost unto death, of the ultimate canal portion of pulps, but in these cases *it is no such thing;* on the contrary, it is a condition which supervenes even while the *bulbous* portion of the pulp is not only *not dead* but *excessively alive.*

As will readily be recognized, it is very difficult to prescribe a treatment which, without the additional teaching of experience, will enable one to conduct such a case to a satisfactory termination with the minimum of infliction, but I hope to be able to give such basal directions as will form a foundation from which such slight variations may be made as will satisfactorily meet the indications in a vast majority of instances.

In the first place, then, if the filled cavity of decay is so located as to afford a desirable ingress to the pulp-cavity and canals, and has been filled with a material comparatively easy of removal, as gutta-percha, oxychloride of zinc, tin-foil, or amalgam, it is best *generally* to remove the filling, being careful to avoid the least unnecessary mechanical irritation while so doing.

I have omitted *gold* in my list of filling materials comparatively easy of removal, because I would be understood as referring only to such fillings of that material as had been thoroughly and solidly impacted, and exceedingly well introduced.

Such fillings are usually difficult of removal, and particularly so from very tender, aching teeth.

NOTE.—In regard to the removal of *amalgam* fillings, I would say that the employment of mercury for softening them and rendering them easy of removal is *not a "fraud,"* as has been asserted, but that the failures in its use are attributable to the manner of its *misuse.* If small drill-holes are made in an amalgam filling with small spear-pointed drills (sharp) as closely together as is practicable, and as deep as is consistent with safety and comfort, and these drill-holes filled with mercury, carrying it to the bottom of each with a small probe, or (better) with the revolving drill, a marked softening or "rotting" of the material will take place in from fifteen to thirty minutes, after which the removal of the filling with a *sharp* rose drill is an operation of short duration and easy accomplishment.

(To be continued.)

THEORIES AND PRACTICE CONCERNING THE PRESERVATION OF IMMATURE PERMANENT TEETH.

BY JAMES TRUMAN, D.D.S., HANOVER, GERMANY.

(Read before the American Dental Society of Europe, at Interlaken, Switzerland, August, 1877.)

When Spooner declared, in 1830, that a pulp could be destroyed without the use of the actual cautery, the first glimmerings of real progress began in the treatment of teeth. From that period dates all that can be considered worthy the name of dentistry. The best thought of the profession was given to this subject, and it has required the combined work of many hands and brains to reach the present advanced position. The apparently simple thing of filling a cavity has cost more thought, more experimenting, and has, in its outworking, covered more years than almost any other of modern human efforts. The devotion to the practical has been too great to admit of much or extended observation as to theories. But we have now reached another era, and the active mind is no longer satisfied with the conclusions of the past. The philosophy of cause and effect must be fully demonstrated before mere assertion will be recognized as authority.

To my mind the subject of filling teeth, as a whole, but especially that of the treatment of children's teeth, is one of those that needs some theoretical attention. We do not specially require the practical, but we do need, myself included, more light on many obscure points. We are familiar enough with the manipulation of gold, tin and gold, tin, plastic fillings, but we do not yet know, absolutely, when or where these will give the best results, or where, by using any one of them, failure will follow. This may seem a strong expression of opinion by some who have regarded their work as perfection itself, but I believe it to be a recognized fact.

That most truly empirical assertion, which for so many years held sway over the minds of dentists, "that any tooth that could be filled at all could be filled with gold," has no longer the slightest glimmer of truth in it. As a mere assertion of a fact, that wherever another metal could be placed, there gold with equal facility could be packed, it may, in part, be true; but if the broader signification was intended that gold was the best material to use in all classes of cavities and upon all kinds of people, without regard to idiosyncrasies, then a greater error was never engrafted upon our profession, or one that has been more prolific of injury. It is quackery in its best estate. It is treatment without reason, and success made to depend on a chapter of accidents. Through its insidious influence the dental mind has been warped and narrowed until it is almost impossible to uproot the parasite and engraft upon the body the better axiom,—"That intelligent diagnosis precedes manipulation."

Our work is, necessarily, circumscribed; but it is connected with some of the most important organs of the body, and these, in their turn, are part of a magnificent whole, throughout which permeates a mysterious force, which, in our ignorance, we call life force, uniting, governing, and sympathizing with the minutest atom or molecule of our being. Every atom is dependent on some other atom. Every germ diseased, in greater or less degree, affects every other germ, and these aggregated make up what we term visible pathological conditions. We may not be able to trace disease to its remotest origin or to its extended ramifications, but it is no less a duty to study the effects. Then we may in degree observe and in observation learn that human efforts are fallible, and that many of these will come to nothing. In other words, we have not yet learned how to battle with the special disease it is our peculiar work as dentists to overcome. Caries still runs its riotous course, notwithstanding all the skill that has been devoted to its eradication. In writing this I would not be understood as indorsing the very, to me, erroneous idea that nothing has been accomplished towards lessening the evil. In this respect I disagree with some recent writers, and believe it is susceptible of demonstration that the teeth of this generation in America are superior to any that have preceded it. The "stamping-out" process, as it is termed, is going on, and, in the progressive development of better forms that must come in the natural process of evolution, greater results will be witnessed. To bring this about will require closer study of causes than has, to any large extent, been given. It is a broad field, and worthy the best effort and the closest analytical reasoning of the future dental mind.

The object of this brief paper is not, however, to call attention to the mysterious ramifications or to the remote causes of caries, or to that correllation of forces that insures destruction, but is more directly associated with the practical bearings of the processes of manipulation at certain periods in the growth and development of the dental organs. From the period when the germs of the teeth are manifested in the epithelium of the mucous membrane, until apparent perfection is reached and the tooth assumes its proper place in the series, we know that there is a progressive development, a gradual building up, from germ to cell, from cell to tissue, as long as vitality remains. This development goes on until perfect calcification is accomplished and vitality ceases. In other words, a tooth is a complicated system of nutrient passages. Calcification once begun continues ordinarily throughout life. If it should be completed at any period before its expiration, the tooth becomes a foreign body. Fortunately for the human family, this does not often occur. Consolidation at all sources of nutrition is comparatively rare, but that it does take place is patent to every investigator. I am aware that as good an histologist as Wedl denies this, but the conclusions of the elder Tomes have been confirmed, so far as I am aware, by every observer since, with this single exception. But whether it be true or false, the main fact, that progressive calcification does take place, is an admitted truth. Upon it we base a large portion of our hopes, and, but for it, the treatment of many teeth would be an impossibility. It must be clearly understood that deposition of inorganic material proceeds with extreme slowness, and that within certain periods the functional activity of the tooth is most highly developed; that, inasmuch as there is imperfect consolidation, there must be a hyperæsthetic condition consequent upon the greater facility of inter-communication. The normal development of dentine has not, at this period, ceased. The so-called tubes are larger; the remains of the formative pulp occupy a very much greater portion of the body of the tooth, and, as a consequence, the soft tissue is more extended than at a later period. This, I presume, needs no proof. It has been demonstrated over and over again. To the casual observer it manifests itself in an enlarged pulp-chamber, extending in the incisors almost to the border line of enamel and dentine, and in the increased size of the pulp-canals. This period, for our purpose, ranges from the first visible eruption to mature years. That time which we, as dentists, must most carefully observe, is that between twelve and fifteen, and, in many cases, to a much later period. The time of more perfect formation can only be approximated. The prognosis must include a variety of considerations. The general health of the individual, those occult sources of disease handed down through inherited influences, climatic effects, surroundings, food, habits, pathological conditions, present and prospective, all will retard or absolutely prevent nutrition, and, consequently, calcification. The effect of non-nutrition is not as marked here as at the earlier periods of tooth development, when it will entirely destroy the normal growth, prevent the calcification of enamel-cells, and disarrange the development of dentine, so that it assumes marked peculiarities. It is, however, none the less evident in a long-continued, soft structure,—which I term the transition chalky period, for want of a better name; the teeth are soft, cut readily, and, for the reasons before stated, are acutely sensitive. This latter state may be still further augmented by the chemical action and irritation of acid secretions in the oral cavity. Abnormal deposits may be hastened and largely increased by slight irritation, while an aggravation of the disturbing element results in hyperæsthesis, and rapid destruction and absorption of the surrounding tissue. This may be illustrated in the one case by the deposit of cementum in exostosis, in the osteo-dentine of the tubulated structure of dentine, at the progressive advances of slow caries, and in the secondary dentine deposits of abraded teeth, and is frequently exhibited in the deposit of osteo- or secondary dentine subsequent to the capping of a pulp. These examples serve to illustrate the minor force necessary to establish extra development. On the other hand, we can notice the destructive force of a powerful instrument in a filling placed over a thin layer of dentine and its subsequent exposure. In the latter case the irritation exceeds the bounds of healthy irritation, and becomes destructive by over-stimulation.

If I am correct in these premises,—and experience and observation sustain these views,—the question is presented with increased and ever-increasing force, What shall we do with teeth at this transition period? We have certainly been using a force for years that has been not only not needed, but has proved, and will ever continue to prove, destructive. The wrecks along the highway of professional practice are all silent evidences of our want of intelligent adaptation of means to ends, of an empirical attempt to correct one evil by creating another, and a greater one in an endeavor to force natural laws from the course of due fulfillment, and in their place to substitute our own crude conceptions and imperfect manipulations. From this sweeping condemnation none of us are free. What is true of this special subject is true of almost every operation we perform. We have the excuse in the fact that, as pioneers, we were traveling an untrodden path; but the future will not accept apologies for imperfect work, and it is time that our course should be clearly mapped out and the right direction taken.

If my conclusions are correct, it follows that the plan heretofore pursued, of a blind adherence to gold under all circumstances, is a folly that amounts almost to criminality. This is, in degree, true of all metals. What conditions have we in any or all of them to meet the demands of a filling at this transition period? I do not propose to enumerate all their good or bad qualities; that may properly be left for the books. My purpose will be served when I state that gold is one of the best conductors of heat and cold known. Tin is one of the poorest; gold and tin combined occupying a medium position. It requires no argument to prove that gold is, therefore, the most inappropriate material we can use in a large class of cavities. This condemnation will not only apply to teeth in the transition stage, but to all periods where conditions are not suitable for its presentation. I need but to refer, in this connection, to a hyperæsthetic cavity combined with a closer approximation to the pulp. Here are direct conditions that contra-indicate its use. The greatly irritated state of the soft tissues permeating the tubules has reached a point when any further augmentation will not be—cannot be—tolerated by the main body. The result is an extension of the irritation of the soft fibers to the pulp, its congestion, and final death. It is clearly evident that we have the analogue of this in the immature tooth when attacked by caries. We have a surface of exalted sensibility. The access to the pulp is greatly facilitated by enlarged modes of transmission, and we have an increased vitality which, while it resists aggressive influences, will also aid the destruction by its greater activity.

It must be evident, then, that the employment of any material that will irritate the sensitive surface is clearly inadmissible. If it will always be borne in mind that an equal amount of care is required here in treatment, as in an exposure of the pulp, greater caution will perhaps be taken than, I fear, has been in the past.

From the arguments I have adduced, it must be evident that the soft tissues of the formed dentine possess the same general character, the same intolerance to foreign bodies, the same antagonism to undue extremes of temperature, and, while we may not have inflammation, we can have destruction. The death of a single microscopic fiber is a source of irritation to the main pulp. When all are combined the aggravation must seriously affect that organ, and its death is only a question of time in the majority of cases. Where this has not followed, the evil results have been counteracted by causes that are, necessarily, exceptional in their operation. It must be evident then that the use of a metal is clearly inadmissible; or, if one be used, the selection must possess the lowest conducting power.

The bad consequences following an opposite course of practice were forcibly called to my own attention some years ago by the destruction of the pulps of the superior central incisor teeth of a patient. The operations had been performed with care in comparatively shallow cavities, yet the result was as stated. This led to a thorough review of the whole subject, and, so far as the writer was concerned, an entire change in this part of practice. Caries respects neither age nor structure, but we cannot meet it always by the same course of treatment.

In order to accomplish the end desired, those materials should be made use of that combine facility of manipulation with low conducting properties. This, necessarily, limits our operations to tin, gutta-percha, or a combination of the latter with other materials. In my judgment, the proper course to be taken is to fill the anterior teeth with Hill's stopping or a similar preparation, and allow it to remain until the period of greatest danger has passed. This, as before stated, will depend on a great variety of conditions, and can only be determined by personal observation. Tin is an excellent material for all posterior teeth, and, but for color, would be equally good for the anterior. Oxychloride of zinc is objectionable for reasons already given. Its irritant qualities lie in the caustic properties of the chloride of zinc. This is counteracted, to a large extent, by its antiseptic character; but, in a thin layer of dentine, this is not sufficient to prevent the irritation of the soft fibers extending to the pulp; the vessels become congested, the pulp enlarges and is compressed within the walls of the canal, action and reaction take place, which ends in its destruction. As this is substantially true of all immature teeth, its use is contra-indicated, except where the walls of the cavity have been previously coated with a solution of gutta-percha in chloroform. This can be painted on with a camel's-hair pencil, and, if care be taken to have the film of proper resisting thickness, this material may be used with safety. The same course may be adopted with metal, but the danger increases in proportion to the conducting property of the material. The only safe plan is to confine the anterior fillings to gutta-percha in some one of its forms. The adoption of this course alleviates much of the suffering, effectually preserves the teeth for a limited time, and gives more satisfactory results in the future. This, as I understand it, is the desired end and aim of all our operations.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.—SEVENTEENTH ANNUAL SESSION.

SECOND DAY.—*Evening Session.*

THE meeting was called to order at the usual hour.

Miscellaneous business being in order, Dr. John Allen offered the following resolution, which, after some debate, was indefinitely postponed:

> *Be it resolved*, That a committee of three be appointed by the chair to revise and amend such portions of our present Code of Dental Ethics as do not harmonize with each other, and report the same at our next annual meeting.

Dr. Spalding, of St. Louis, said that he was not in favor of codes of ethics; he looked upon them with disapprobation. He preferred to appeal to sentiments of justice and right in the members of the profession. Perhaps a few rules should be adopted, but they should be very few.

Dr. Morgan was opposed to much legislation, but rules and laws, and stringent ones, were necessary in any body. He is astonished at the showing that Dr. Allen makes; it is the most unfair thing he ever heard from him. The speaker read from the Code of Ethics to show precisely what was forbidden.

Dr. Allport thought the discussion of the matter a waste of time, and moved an indefinite postponement of the resolution. Carried.

A volunteer paper by Dr. Edgar Palmer, entitled "The Potency of Alcohol to cause Degeneracy of the Human Teeth," was then read. We give a synopsis, as follows:

The paper proposed to confine its investigations to the effects of alcohol upon the dental organs. It attempted to prove, first, that alcohol has nothing to do with the nourishment of the organism, and, second, that when habitually taken into the system as a beverage or to excess, it produces marked deteriorating physical effects, involving the dental organs. In discussing the subject the writer referred only to unadulterated spirits.

Whatever helps to maintain the body in perfect order, or which helps it to move of its own will, may be considered nourishment. Foods are divided into two classes,—those which supply material, and those which supply heat or force. The building-foods contain nitrogen, and the force-supplying foods are hydrocarbons. All the organic parts of the body are composed of colloidal or soft-solid substance. Water and saline substances also enter into combination with the other ingredients. In the teeth, the gelatin is combined with the phosphates and carbonates of lime. Excepting the water and salt, all the constructive parts of the body take their qualities from the nitrogen they contain; they have their source in the vegetable kingdom alone. Alcohol contains no nitrogen; has none of the qualities of structure-building foods, and is not a constructive agent. On this basis, we regard alcohol, except when limited by medical skill, as something superadded to the necessities of life. It may then have the power of producing pathological phenomena. It does this, and in doing so destroys the integrity of the colloidal matter of which the tissues are composed. When it comes in contact with the blood, it modifies its function and impedes its current, to an extent sufficient to affect the remotest organ. In the membranous structures, which are the filters of the body, the continued use of alcohol induces a perversion of action, by extracting the water from them, producing a thickening and inactivity which reduces their powers, and cuts off nutrition. Alcohol also causes a contraction of the corpuscles of the blood, which impairs their function. The vessels of the human teeth are under the same influences as those of any other organ in the body, and are stimulated by the same nervous action, including those at the extremity of the circulation. The delicate membranes which surround the nervous cords are acted upon readily by the spirit, and thus combined evils affect the nervous matter. Troubles consequent upon a perverted condition of the membranous covering of some dental nerve are of almost daily occurrence. In view of these researches, we must believe that alcohol, when taken in dangerous excess, enfeebles the powers of life, modifies the character of local and systemic disease, and changes the action of medical agents. The writer believed that its evil effects would soon be recognized as an alarming cause of transmitted disease of the dental organs.

The subject of the paper being open for discussion,—

Dr. Atkinson said that he differed with the author as to the function of the corpuscle,—as to its being the carrier of gases. Corpuscles carry oxygen only by a loose attachment. As to the solution of alcohol in water, the paper advanced some new ideas; he had always supposed that they were miscible in all proportions. The paper states that alcohol is not nutritious; his (the speaker's) belief is that it does coagulate colloidal material. If it can be combusted, it is as essential as any other burning body. Is not the assertion that alcohol is not nutritious placed in doubt? He does not believe in this argument against the use of alcohol. It is the excess which is injurious. Alcohol is manufactured and used in every man's stomach every day.

The subject of Histology and Microscopy was then taken up. The chairman, Dr. Swain, had no report.

Dr. McQuillen described the microscopical exhibition which had been made in the morning,—the dental pulp of a mouse, showing the cells of proliferation and calcification. There was a fringe-like arrangement representing the epithelial cells. In rodents a continuous growth takes place; the dentine is worn away in use so as to form a chisel shape. If the opposing tooth is lost, the tooth keeps on growing, and in one specimen has done so to such an extent that it enters the skull. There is a wide field for investigation here, and those who can do so should improve it.

The subject was then passed, and that of Chemistry taken up.

Dr. Taft read the report of the committee, which was written by Dr. J. S. Cassidy. The following is a synopsis of this paper:

The paper referred to the complicated nature of reactions due to decomposition, a condition especially the case in the oral cavity, when various ingredients are commingled in small quantities. The committee had instituted some experiments on extracted teeth. Believing that acids taken into the mouth do not primarily cause cavities of decay, they were ignored, and the experiments confined to more rational modes of procedure. Two cases of teeth, each containing central and lateral incisors, cuspids, bicuspids, and molars, all comparatively sound, were prepared by imbedding the teeth in plaster. To obtain a uniform temperature of 90° F., a bottle of sulphuric acid was arranged so as to allow a slow dripping of this substance into a dish of water in which was a bottle containing the reagents. The mixing of the acid and water produced the requisite heat. The experiments were directed to the development of acetic and lactic acids, as most capable of destructive effects among the organic acids. Strong cider, to which was added a small quantity of malt, was used to produce acetous fermentation; to produce lactic, raw sugar was mixed with milk, water, and putrid cheese. These mixtures were placed in the glass vessels already mentioned, and the cases of teeth suspended in them near the surface; and both vessels were immersed in the acid bath. Nearly three months had elapsed since this was done; a greenish film encircled the teeth at the line bathed by the surface of the liquids; no solution of continuity was visible, but the dentine lining the existing cavities was considerably softened. No effect on enamel at expiration of five weeks. A deciduous tooth then extracted was immersed in the bath, its neck being slightly grooved by decay, and covered by the well-known green deposit. At the end of six weeks the crown was tunneled through, and the enamel softened in patches. The enamel of the other teeth had been scarcely affected. This is explained by the fact that acetic acid is scarcely capable of dissolving calcium phosphates when organized, even in a dead tooth, though it dissolves gelatin with avidity. From these experiments, it is inferred that the greenish deposit and white decay found at the necks of children's teeth, and sometimes on those of adults, is due to acetous fermentation of particles of starchy food. This class of decay is therefore more susceptible than all others to prevention and control. A tendency to recurrence may be counteracted by suggesting dilute acetic acid (vinegar) as a condiment. On all the teeth submitted to lactic fermentation there is well-marked abrasion.

The report closed by alluding to the theories on the subject of oral electricity, which have been advanced during the last four years by several well-known writers; theories which in the main contend that "every tooth containing a plug is a galvanic battery set in motion the moment a portion of acidulous fluid touches both plug and tooth." The committee thought this doctrine apparently founded on true scientific principles, though they were not unanimous in accepting it unreservedly.

The meeting then adjourned.

THIRD DAY.—*Morning Session.*

The association was called to order at the usual time.

The special order was the consideration of the report of the Committee on Sections, which was read, as follows:

To the American Dental Association:

Your committee, in obedience to your instructions to consider the subject of forming this association into permanent sections, and to lay before you the result of that consideration, respectfully report, that they have been strongly impressed with the importance, and indeed the necessity, in order to execute properly our mission, of applying to every subject within the scope of our investigation and research the suggestion of Dr. J. Foster Flagg with reference to one —pathology,—that is the constitution of permanent sections, to be the analogues of the committees hitherto appointed to prepare and present papers to this body.

The principle of division of labor and concentration of effort, so extensively adopted in the successful prosecution of ends in so many business interests, and that have been so happily practicalized in this body, would seem to apply with peculiar force to our investigations and researches, since we have before us a field so wide, and embracing so many branches of science, that no one man can hope to master them all, or even a considerable number of them, and at the same time pursue the practice of his profession.

It can therefore hardly be doubted that the members of this association can accomplish more for the advancement of the interests of our profession by persistently pursuing scientific inquiries, as connected therewith, in a single direction or on a limited number of subjects, than by the present system of preparing papers or essays year after year, and each year on different subjects.

Holding these views, your committee present for your action the following resolutions:

Resolved, That the membership of this association be and is hereby divided into —— permanent sections, each section to be composed of such members as may elect to unite and form that section.

Resolved, That it shall be the duty of each member of this association to connect himself with some one of these sections; but that he shall be free to follow his own preferences as to the particular channel in which he will labor, and may, if he so desires, be a member of two or more sections.

Resolved, That the members of each section shall, at some time during each annual meeting of the association, elect a chairman and such other officers of the section as they may see fit, whose duty it shall be to see that the labors of the section are conducted in the manner calculated to secure the best results.

Resolved, That each section shall have charge of one of the subjects or branches essential to scientific dentistry, and through its chairman, or such other member as it may select, report upon the same to the association at each annual meeting

Resolved, That after the several sections shall have been fully organized and in working condition, it shall be the duty of each chairman to furnish the latest and best information in the possession of his section upon any point connected with its subject, to any member of another section who, through the chairman of his own section, may apply to him for such information.

Your committee have omitted the division and nomination of the subjects or branches essential to scientific dentistry. Should this report be adopted they can be easily named.

The number of permanent sections is left blank, as that must correspond to the number of subjects or branches determined upon.

Respectfully submitted,

R. Finley Hunt,
W. H. Morgan,
W. H. Atkinson,
Committee.

Dr. Atkinson thought that the mere naming of the plan proposed should secure its adoption.

Dr. McQuillen said that he did not at first regard the plan with favor, but now he indorsed it.

Dr. Morgan approved the report heartily; the transmission of gentlemen from one committee to another was not beneficial.

Dr. Shepard thought the report should be postponed.

Dr. McQuillen said that he was decidedly opposed to one man or a number of men having the power to appoint the committees; gentlemen who were willing and anxious to serve had been informed that their services were not wanted. The plan proposed would be more satisfactory.

Dr. Barker moved that the report be recommitted, and three new members added to the committee.

This motion was carried.

A motion was then made to reconsider, which was carried.

At this point motions and counter-motions were piled upon one another with such rapidity as to involve the matter in apparently hopeless confusion.

Dr. Spalding moved to increase the number of the committee to ten, and to instruct the publication committee to print and distribute the report as it stands.

Dr. Shepard moved that the final report of the committee should be printed, and distributed to members at least one month previous to the next meeting.

Dr. Barker accepted Dr. Shepard's amendment.

A division of the question being called for, the question was put on the motion to increase the committee from three to ten members, which motion was carried.

The previous question was then ordered, and the motion, as amended and reduced to writing, was put and carried, as follows:

Resolved, That the committee be increased to ten members, and that the report presented by the committee of three be recommitted to said committee for amendment or reconsideration, and that they be instructed to print the results of their deliberations, and that a copy be mailed to each member of the association at least one month before the next annual meeting.

So the report was recommitted to an enlarged committee of ten, who were appointed by the chair subsequently, but are for convenience inserted in this place, as follows:

Drs. R. Finley Hunt, W. H. Atkinson, and W. H. Morgan (original committee); C. W. Spalding, St. Louis; H. Judd, St. Louis; H. A. Smith, Cincinnati; G. T. Barker, Philadelphia; J. H. McQuillen, Philadelphia; J. N. Crouse, Chicago; L. D. Shepard, Boston.

The subject of Chemistry was then resumed, and Dr. Taft read a report written by Dr. C. J. Essig.

The following is an abstract of this paper:

The report was devoted to the consideration of certain fallacious ideas in regard to mercury and its compounds, which the writer believed are entertained in many quarters. In many cases physicians believe that the presence of an artificial denture may produce the constitutional effects of mercury. The committee had investigated the subject; they find, first, that the opinion commonly entertained that red rubber is colored by an oxide of mercury, is a fallacy; second, that it is not the case that vermilion, the pigment commonly used, possesses active properties, and that the red and inflamed condition of the gum, so often seen under rubber, is due to its action. Recent investigations prove the substance to be inert.

The committee had examined several rubber plates, by the use of one of the best microscopes in the country, some of which had been worn for years, others were new. No metallic mercury was found, but abundant crystals of sulphur. The plates were then subjected to solutions of citric, acetic, and hydrochloric acids, and also to fluids simulating the gastric and salivary secretions, at a temperature of about 97°, for a period of four months, at which time they were again examined, and nothing found upon the surface. The fluids were then tested by Rauch's test, and no trace of mercury was discovered; and a test by the spectroscope confirmed the previous one. Experiments with vermilion demonstrated the fact that decomposition could not be effected much below 600°, a heat which would be destructive to the plates themselves; nor can it be decomposed by nitro-muriatic acid, a fact which precludes the possibility of corrosive sublimate being formed in a rubber plate. The committee had also experimented with amalgam, and were of the opinion that ptyalism is not likely to occur from the presence of that substance, since it can only be decomposed by strong mineral acids.

The subject being open for discussion,—

Dr. Palmer said he did not think this body would believe that there was no mercury in red rubber; he had often seen it under a glass.

Dr. Robertson had seen a case where ulcers which appeared under red rubber had disappeared when black was substituted.

Dr. Osmond said that he had filed up rubber and submitted the filings to the action of muriatic acid, and has never been able to find mercury in the filings. He had seen plates vulcanized at a high temperature and in a short time, which were highly polished on the surface, but were rotten inside; such plates when tested showed the presence of mercury. Mercury is probably set free by vulcanization at too high a heat, but is inert when properly vulcanized.

Dr. Noel did not think it followed that there was free mercury present; it might come from any other source. This subject was discussed at Nashville; he had experimented with rubber, and had come to the conclusion that most of the cases of disease were due to plates being worn at night.

Dr. Osmond said it is impossible to decompose vermilion by hydrochloric acid; there must, therefore, be free mercury present.

Dr. Judd. The question is not whether there is or is not free mercury in rubber, but whether the red sulphuret when in the mouth produces irritation or not. It is a fact that when experiments are entered into to prove a preconceived idea, they are worthless; experimenters should go into such things unbiased. If the red sulphuret is insoluble, it may be put in the mouth and kept there.

Dr. Friedrichs, of New Orleans, indorses the views of Professor Judd. He thinks the red rubber does not produce more irritation in the mouth than other plates. There are a million or more of them worn in the United States, and only a few cases of disease are produced, not sufficient in number to counterbalance the usefulness of the material, or to demonstrate the presence of a poisonous substance. He is not an advocate of rubber, but cannot see how it can poison, except by a combination with chlorine in the system.

The subject was then passed.

The subject of Therapeutics was taken up, and Dr. Shepard read the report of the committee, written by Dr. Brackett.

The paper alluded, first, to a communication from Dr. H. L. Sage, in the *Dental Miscellany*, in regard to the efficacy of carvacrol in relieving sensitiveness of teeth much worn down. In an aggravated case of this character, carvacrol in full strength applied for one or two minutes immediately and completely relieved the sensitiveness, which in two years had not returned. The experiments of the committee tend to show that this medicine possesses valuable obtunding properties. The odor appears to be the principal objection to its use.

Several suggestions have been made as to the relief of sensitiveness by a nearly perfect dryness of the cavity. The use of a small piece of heated pumice stone was mentioned by Dr. Flowers at a meeting of the Pennsylvania State Dental Society.

Professor Stellwagen has suggested in the dental journals a new cautery, and its application in sensitive cavities not approaching the pulp, and also in general surgery, which consists of the hot ash and coal on the end of a stick of ignited compact wood. The ash being antacid and warm, neutralizes the fluids, and desiccates the dentine; and, finally, the heat of the coal itself may be momentarily applied. With this treatment the committee had had no experience. Several proprietary preparations for sensitive dentine have been brought out, but the committee had not learned that any of them possessed much merit.

In regard to the use of hypophosphate of lime for sensitive dentine, and to prevent trouble following metallic fillings, added experience had confirmed the good impressions recorded a year since. In no instance had it been used without benefit, and in most there had been no after-sensitiveness whatever. One very marked case was recorded in which it had proved of great benefit. The saturated aqueous solution is generally employed; the cavity being prepared and dried, is treated with the solution, which is allowed to remain undisturbed for some minutes, when the water is evaporated with the warm-air syringe, leaving an incrustation of the lime salt. It is claimed that chemical union takes place between the salt and the contents of the tubuli. The crystals should be carefully removed from around the edges. Even in cases of proximity of the pulp, gold may be introduced immediately, with assurance that all will be well. In cases of complete exposure this substance appears to serve admirably as a capping, applied with sufficient water to hold the crystals together. Gutta-percha may be used over it.

In the general treatment of the pulp, thinking men are concluding that it is not to be soothed with all sorts of irritants, escharotics, and caustics. It is generally considered that if the peripheral pulp-cells are destroyed, the chances of success in saving the pulp are much lessened.

In the Odontological Society of Great Britain, Dr. Joseph Walker presented a paper on the treatment and extraction of the pulp, which considered the manner of maintaining an arsenical application in contact with the pulp, so as to have it nearly painless. The idea advanced was that much depended upon having the arsenious acid as finely triturated as possible. The manner of applying was to dip the apex of a wool cone into creasote, then into the finely powdered arsenic, and lastly into morphia, which latter is thus first presented to the pulp, so as to render the arsenic painless in its action. One of the speakers, in discussing the subject, said that the end was best attained by using arsenic and carbolic acid alone, a piece of blotting paper being used to carry a small amount of arsenic, wet with carbolic acid, to the spot. Dr. Flagg recommends the use of oil of cloves as a vehicle, an escharotic being undesirable. Reference is also made to the length of time during which arsenical applications may be left in the tooth without injury, as detailed by Professor Flagg in the DENTAL COSMOS of June and August, 1877. His positions have been corroborated by the experience of the writer, but it is not amiss to remind the inexperienced that arsenious acid is a power for evil as well as good, and carelessness in its use should never be allowed.

Tannic acid has been recommended as rendering the pulp more easy of extraction, if applied twenty-four hours after the arsenic. The same drug has been recommended for the permanent filling of pulp-canals in some cases.

The paper then alluded to the use of Dr. Farrar's abscess syringe as well adapted to the treatment of alveolar abscess, with any appropriate medicine. The use of the dental engine with a coarse, sharp bur, was spoken of as successful treatment of chronic cases of alveolar abscess, breaking up the diseased tissue. Salicylic acid, though not so prominent as when first introduced, possesses in a good degree the properties claimed for it. It is useful in treating foul canals, and also fetid wounds in the oral cavity.

The treatment of recession of the gums and absorption of the alveoli by Dr. Riggs's method was favorably mentioned, and the writer bore testimony to its great merit, and regretted that few if any practitioners were able to use Dr. Riggs's instruments as he intended they should be used.

The report closed by alluding to the frequent fatal results from the use of anæsthetics, which were leading thinking men to avoid the administration of such powerful agencies in trivial cases.

Adjourned.

Afternoon Session.

After the usual preliminaries, the subject of Therapeutics was resumed, and Dr. F. M. Odell read a report, of which the following is an abstract:

Therapeutics, as signified by the derivation of the word, is the branch of medicine which treats of curing disease, its symptoms, and the power of nature to correct pathological conditions. Its extent is sufficient to embrace all the collateral branches of the science of medicine. The writer directed his efforts in this paper, however, to a general survey of the field.

A wise and gentle therapia demands thorough investigation and consideration of each case; the veracity of the patient must be considered, and the various appliances of modern diagnostic investigation must be employed; after which, the experience of the practitioner must guide. Modern research, with the system of recording cases and experimentation, and especially microscopic investigation, enable the practitioner to act with some scientific ability, even in cases which are new to him. He should not lose sight of the facts that the etiology of a disease furnishes the best indication for its treatment, and that unaided nature is frequently the best physician.

The duty of the practitioner is often simply to remove obstructions to function, rather than to administer prescriptions; to do *nothing* is frequently the best therapeutics.

Impaired function in any organ induces starvation of the fluids or tissues necessary to health. Promotion of secretion and excretion is the first step towards resumption of the normal processes of nutrition; the worn-out cells must be cast off, and their walls disintegrated; the proper emunctories must throw off matters which, if allowed to remain in the system, would result in speedy dissolution of the organism.

Water is usually the first, last, and greatest of therapeutic agents. As an adjuvant to other measures, water *ad libitum* makes all the difference between success and failure in therapeutics.

Many diseases are not such *per se*, but are simply overaction of certain organs, producing an excess of nitrogenous waste. In these cases the plain indication is, first, to reduce the consumption of nitrogenous food; second, to give large draughts of fluids to assist in washing out the accumulated salts; and third, to do nothing to prevent excretion from glands acting vicariously, which is simply nature's mode of cure. In many instances, so-called tonics do not prove to be such when administered pure; but when combined with specifics, their beneficial effect is soon apparent. The ancient use of purgation and diuresis is engaging attention, but the subsequent therapeutic treatment has greatly changed for the better, and the skin is now one of the first emunctories to which remedial measures are addressed. Habits of cleanliness, good ventilation, abundant and good food, regular attention to the demands of the system, and an intense devotion to some pursuit which shall leave no time for ailments, are measures both prophylactic and therapeutic, which, with most persons, will produce the greatest measure of earthly happiness.

The subject being open for discussion,—

Dr. Atkinson said that he had never heard so much condensed intelligence as was contained in that paper. He thought the greatest objection to rubber was its tendency to induce wasting of the tissues when long worn. He had never seen a case where rubber was worn where this was not present, and had seen many extensive absorptions, and had seen the soft tissues entirely deprived of bone, which he had never seen under any kind of material except rubber. If this is the result of wearing rubber, we ought to know it.

Dr. Judd said he had seen cases where a part of the plate was red and part black, and the disease was marked under the red portion, and entirely absent under the black. Had seen fifty cases of diseased mouths under well-fitting red rubber plates, which were cured by changing to black rubber.

When the pulp is uncovered, there is in many cases a removal of the external membrane, a loss of substance in the pulp itself, and there must be a restoration in the odontoblastic membrane if there is to be restoration to health. If we want to restore the pulp to health, we must have this fact clearly in mind when we cap it, and must not destroy by escharotics any more of the pulp than is already destroyed. No destructive inflammatory action should be produced in capping.

Dr. Atkinson had seen amalgam fillings remain two, three, and five years over an exposed pulp, which remained healthy; had seen the bone close over the pulp and seal it in. He does not think the ossification an outgrowth of the odontoblasts.

Dr. Rehwinkel said his practice was contrary to the statement of the paper, that arsenic and carbolic acid is as good as any other form of applying the medicine. He had experimented on this subject, using cotton, carbolic acid, and dry arsenic at first, but now wants no cotton. The smaller the bulk and amount of the agent the better. Squibb's concentrated arsenious acid is best. Pain is often produced by pressure of the cotton. He applies the arsenic on a silver or gold wire, in direct contact with the the pulp; absorbs the moisture with paper, and places a solution of gutta-percha in chloroform over the arsenic, stopping the cavity with wax or mastic, or anything except cotton, and has yet to see the first case of trouble from arsenic. He never applies arsenic to back teeth without putting on the rubber dam. Objects to cotton, because it swells and produces pressure upon the pulp.

Dr. Nichols, of Chicago, has used the paste for ten years, and, like the last speaker, had yet to see the first case of trouble. Had formerly had trouble with cotton, and had seen extensive necrosis as the results of its use. Makes a paste of arsenic and carbolic acid, and applies with a probe, closing up with plaster of Paris.

Dr. Barker. There should be good reasons for abandoning old practices. The ordinary paste has been used successfully and effectively. He is surprised that Dr. Rehwinkel can claim universal success. Any one who applies arsenic to a congested pulp will cause pain. The pulp dies because the arsenic overwhelms the vital forces.

When a pulp is not in a hyperæmic condition, it may be destroyed by arsenic alone.

The subject was then passed.

The subject of Operative Dentistry was then taken up, and Drs. G. H. Cushing and A. W. Harlan, of Chicago, read reports upon the subject. We give the following synopses:

The object of the report (Dr. Cushing's) was announced to be to state the present status of operative dentistry. The writer alluded to the fact that for years the better men of the profession had felt that the results of many dental operations were not proving as successful as desired, or as formerly. The cause is by some considered to be faulty operations; if this was the case it could hardly be remedied, since the skill of the best men is unable to prevent failure; at least, there are so few who are able to do so, that their skill is practically unavailable by the mass. Others ascribe it to cohesive gold. That this explanation is not satisfactory, is evident from the fact that failures are more frequent of late years, though cohesive gold had been previously exclusively used. Over-malleting has been considered one of the causes, and justly so; yet it hardly covers all. The electro-chemical theory claims to fully explain it, but its advocates have failed to furnish proof of its truth,—experiments out of the mouth prove nothing as to what occurs therein. Tin has been considered by many a better material than gold for preserving teeth. The committee, however, are not aware of any virtue in any filling material, other than perfectly excluding air and moisture; and if tin serves the purpose better, it is probably because it is more easily manipulated. From correspondence, and personal exchange of views, the committee arrive at the following conclusions:

1st. That the use of tin in combination with gold, advocated by some, has been resorted to to a very limited extent.

2d. That the use of amalgam has largely increased during the last two or three years, and more particularly among men of high repute. Out of fifty communications on this subject, thirty-six express this opinion; some say a large, and others a perceptible increase; only five say there is no increase. This fact may be ascribed to various causes, such as the experiments and discussions upon the subject, and the improved character of the alloys furnished. Some used it experimentally, because gold had failed; others without reasoning upon the subject, and others still because of the necessity of a cheaper material than gold.

3d. The use of non-cohesive gold has largely increased of late, and is still increasing, especially at the margin of cavities; and with this comes a return to hand-pressure. There is also an increased tendency to cut away the teeth so as to secure permanent separations; not, however, to the carrying out of Arthur's system. The rule seems to be a conservative practice of neither restoring contour, nor leaving wide spaces in all cases. Operative dentistry to-day occupies a more conservative position than ever; not running to extremes in either direction,—and this is in one sense an advance.

The question arises, how far this return to the use of non-cohesive gold is based upon positive evidence in its favor, or only upon the failure of the other variety; or is it the result of a desire to render operations more easy?

If we say that fillings of forty years of age are still in good condition, we are told that the teeth of that day were better than those of to-day; but who can say how many of that date have been lost, or whether many of the present fillings will not endure as long? Individual convictions may answer the individual, but they can form no basis for scientific formulas, which can only be formed from comparison of experiences of long duration; a basis which we, at present, have not. A few extremists contend for the use of gold only, while others urge its abolition, and assert that "the coming dentist will be a plastic man." Is it possible that these can advance a scientific basis for their claims? In conclusion, the committee suggested their conviction that what is needed, in view of the present condition of operative dentistry, is a well-digested method of teaching, by honest, capable men, not dependent upon their pupils for support, nor having to earn their living by general practice. One or two really good institutions, endowed so as to be independent of pupil patronage, is the great need of the present time.

Dr. Harlan's report said,—

This subject, though often written upon, will need to be discussed and re-discussed till more reliable means of preventing dental decay are discovered than any now in use. The profession is questioning itself closely as to whether it is doing all that is expected of it in preserving teeth. The diffusion of knowledge by means of the dental journals and societies, and the individual work of teachers,—in marked contrast to the state of things fifty years ago,—is the cause of the general interest in the subject. Since that time has grown up our present system of education, societies, and journals, and a general spirit of study and investigation. No thinking practitioner is now content to accept the mere statement that a new method of operating, or a new material, is better than an old one. He must have good reasons for adopting it, or demonstrate its value for himself.

The readers of the journals have been amazed at the space lately devoted to amalgam, which, however, seems only the commencement of the inquiry into its merits. This body should now engage itself in setting at rest some of the grossly incorrect ideas that a few seem to have absorbed in this matter. The experiments of Dr. Bogue seem to have settled the fact that no constitutional ill effects are to be apprehended from its use; but the writer dissents from that gentleman's conclusion, that with almost any amalgam, used intelligently, teeth can be filled not only so as to preserve them, and without bad results, unless it be from copper.

Experience and observation prove that there is such a want of uniformity in the alloys offered that the same results cannot be expected to follow their use in every case.

There is not now in market an amalgam which does not contract in hardening, as is shown by the fact that the interior of the cavity is soon blackened from oxidation, which would be impossible were it air- and moisture-proof. The writer does not believe that teeth are saved by amalgam, except when very hard and dense. Nor does he agree with recent arguments which apparently prove that gold is the very worst material to fill teeth with in certain cases,—arguments which are disheartening to those who have a little faith left in the preservative qualities of gold and tin. Nor does he agree with the theory that gold is electrically opposed to the condition of the tooth-substance, and that a filled tooth is in a dangerous condition. The exclusion of air and water from a cavity is merely a mechanical operation; and, if so, how can an alloy which does not leak exert a chemically preservative influence on the tooth? Reasoning founded on experiments conducted wholly out of the mouth is not to be relied on.

The writer then quoted at some length from a paper on "Oral Electricity," in which the writer sought to prove the electrical antagonism between gold and "dentos," and dissented from the conclusions therein drawn. The action of acids on a piece of dead dentine is no indication of the action of the oral fluids upon living dentine. The writer of that paper concludes that oxychloride is the best material, in some respects, for saving teeth; and also arrives at other conclusions antagonistic to all our previous experiences, and which would work a mighty revolution in the practice of the profession. One gentleman argues that the power to use gold is, like the skill of the artist, granted to but few; another, that the operation of filling a tooth with it is one of the simplest and easiest. Neither of these is right.

The "rub" is, that it takes more time and skill to fill a tooth with gold than with a plastic material. In the hands of those who feel incapable of inserting a moisture-proof gold plug, any of the baser stoppings are infinitely preferable to the extraction of the tooth; but amalgams, in the experience of the most successful operators, have proven so unreliable that no operator can be pointed out who has used them with success. The writer deprecated the claim for its superior virtues, and failed to see the good results from its discussion. Each of the half-dozen kinds claims to be what none of them are,—perfectly harmless and the best of filling materials; each yields a different result on analysis, and even the same article shows different results at different analyzations. When we have dental journals saying month after month that gold is, in certain circumstances, the worst possible material for filling teeth, and claiming it as a truth beyond question, it is time to ask if this be progress. Dentists will be led to use amalgam freely as a cure-all, and do injustice to their patients. We know that gold produces certain results; but of amalgam it is too much to expect uniformity in the use of it, even by the wisest among us. Some such compound, however, is a necessity, for good reasons, in certain communities; and the only way to derive benefit from it is by the appointment of a committee to investigate and experiment, and report the formula of an alloy that will, if used with care and judgment, give a reliable and innocuous material for filling teeth.

The subject being open for discusssion,—

Dr. Rawls thought that oxides are and would be formed on any of the metals that are oxidable. The dentine is porous; if it is dried with hot air when the dam is on, it becomes darker when wet, showing infiltration of the fluids. Where the tubules are open, plastic fillings are the best, because they can be pushed into the canals.

Dr. Howe, of Cincinnati. More than a year ago a gentleman presented himself for the extraction of a tooth; he was said by a physician to be suffering from mercurial sore tongue. He smoothed the sharp edge of the tooth with the engine, and the disease was cured. The cause was the cutting of the tongue by the tooth.

Dr. Webb, of Lancaster, Pa., said, that while he coincided with Dr. Harlan in most that he said in regard to amalgam, yet in regard to the assertion made by that gentleman, in his report of last year, that "the perfect contouring of teeth is the most absurd of all hobbies," he would say that no better evidence could be desired to indicate that he who would make such an assertion does not fully understand the principles of, and is unable to properly perform, those operations known as restoration of contour. Whatever is worth doing at all is worth doing as well as possible, and it is wrong to accuse those of having "hobbies" who always endeavor to do this.

No one should ever enter upon a calling or pursue a work unless he be enthusiastic in—unless he love—that work, for "*by their works shall ye know them.*"

No theories should be accepted (especially those in relation to operative dentistry) unless he who announces them has demonstrated beyond a doubt that he is capable of doing what he professes.

It is important to know whether those who advocate the theory of recurrence of caries around fillings on account of chemical or electric action, are really first-class operators. If Thomas Fletcher was capable of performing first-class operations, his opinions would be entitled to more weight, but because he is not, his "tests" as to "leakage" are almost if not entirely worthless. Neither he nor any one else can insert gold in a glass tube without a movement of a portion or the whole of the mass of such gold, because of there being no good foundation to build upon,—no starting point. A something might, however, be inserted in one end of the tube, and be so arranged that a foundation may be made; but unless this is done, no form of gold can be anything like perfectly packed in such a place, whether the gold be cohesive or non-cohesive. Even in cavities of decay, the packing of pellets and cylinders without some movement which may lead to "leakage" is equally uncertain. The statement was made last year by Dr. S. B. Palmer, that he agreed with the speaker that "failures, in a great measure, are due to imperfect operations, to imperfect contact of the gold against the dentine," and that "where there is no moisture, there is no action." He also stated, however, that "if a gold filling fails in the hands of a practitioner of average respectability in certain cavities and certain teeth, it reduces that tooth to the second class of teeth, viz., those which must be saved by some other agency than gold." A practitioner may not only be of "average," but of the *highest* "respectability," and yet not be a first-class operator, and even if such a one performs an operation which fails, it does not necessarily follow that the tooth operated upon is "*reduced* to the second class of teeth." It has been truly said that "in the hands of a first-class operator, ninety-five per cent. of teeth may be preserved with gold; . . . but with an ordinary operator, there may not be more than fifty per cent. thus saved." Does not this prove that the success of an operation depends almost entirely upon the capability of the operator?

Pellets and cylinders may do to stop cavities which are treated as simple holes, and where dental tissue is cut away to conform to such filling; but for all really first-class operations the gold should be cohesive, and be so prepared (folded and then cut into small pieces), properly anchored from the first piece inserted to the last impacted (by aid of the mallet), and all made uniform in density; the attenuated edges of enamel should be carefully prepared, built over, and thus protected, and the whole organ restored to the natural type. All, especially young men, should strive to imitate the work of Dr. Royal W. Varney, who, by reason of rare genius and the instruction of a *master*, became, while yet young, one of the finest operators in the world; his fame, like that of Raphael or Michael Angelo, would live after many ages have rolled away, and ever be prominent in the history of operative dentistry.

Adjourned.

Evening Session.

This was a business session, devoted mainly to the election of officers and selection of the place of next meeting, the result of which was announced in the October number of the DENTAL COSMOS.

The only other business done was the offering of two amendments to the constitution; one by Dr. Taft, restricting representation in the association hereafter to *State* dental societies and dental colleges; and one by Dr. Keely, changing the basis of representation of local societies to one for every *fifteen*, instead of *five* members, as at present. Both of these propositions were laid over. A committee, consisting of Drs. Taft, Atkinson, and Judd, was appointed on Nomenclature and Terminology, to report at the next meeting.

Adjourned.

NEW YORK ODONTOLOGICAL SOCIETY.

REGULAR meeting of the society held at the residence of Dr. C. E. Francis, No. 33 West Forty-seventh Street, Tuesday evening, October 16th, 1877.

President A. L. Northrop in the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. W. D. Tenison. I wish to relate the case of a lady who was sent to me by a physician about four months ago. The patient had been under treatment for catarrh for over two years by a gentleman who made such diseases a specialty, without obtaining relief. Discouraged at the poor success of his efforts, her medical adviser sent her to me for a thorough examination of the mouth. I learned from her that when she lay on the left side she could not sleep on account of the mucus that would collect in the throat, compelling her to rise and expectorate.

On examination, I found some tenderness over the first superior molar on the right side, the pulp being dead; the second and third molars had been removed some time previously. Suspecting disease of the antrum, I advised the removal of this molar; the lady strongly objecting on the ground that it had never given any trouble. It was impossible to overcome her objections until her physician urgently backed my advice. I finally extracted the tooth, and the case at once reverted into the hands of her medical adviser. I saw him yesterday, and he told me that within three days the lady experienced great relief, and that she is now about well. No treatment whatever was given the antrum. The case is quite singular and interesting, from the fact that the catarrhal trouble was entirely cured by the removal of the tooth, although under a physician's care for over two years.

Dr. E. A. Bogue. Our friend, Dr. Atkinson, has frequently expressed the wish for a post-mortem case. I have such a one here, but which I am afraid to hand about. The last case I passed around was so nearly ruined that I don't want this one to leave my hands.

He then exhibited a portion of the crown of a molar tooth, having attached to it a large gold plug. The plug he inserted ten years previously, having been appointed at that time one of a committee to test Lamm's crystal gold. He put in about one-half the filling with that material, then became tired, and put in the remainder in the form of cylinders comprised of foil. The crown had broken off a day or two before, giving him an opportunity of critically comparing the difference in the adaptability of the two preparations of gold. There was no difference whatever in this respect; but the crystal gold took more than twice as much time to insert the same amount that the foil did.

Dr. W. St. George Elliott. I would feel gratified if this society would kindly give me their attention for a few minutes, while I describe some new modifications in amalgam instruments. I would premise what I have to say descriptive of them, by giving you a brief history of amalgam carriers. About a year ago, my friend, Dr. Elliott, of Goshen, devised a little instrument for lifting the material and carrying it to the mouth. It consisted, as you know, of two little flat disks, attached to the ends of an ordinary pair of foil-tweezers. Now, while this appliance would pick up and carry the amalgam to the mouth, it would not place it in position, as the points of the instrument were too large to enter the cavity. This objection Dr. Elliott early recognized, and in his instrument subsequently introduced it was effectually overcome. The new device consisted of a small cylinder, attached to the handle at an angle of 45°. The interior of this cylinder was nearly filled by a plunger or piston, connected with the handle, and worked by a spring; and, as the spring was also attached to the handle, by compressing the spring with the finger, the plunger was forced downwards, and the contents forced out. An objection to this instrument was, that the spring was at times awkward to get at. I overcame this difficulty by attaching the handle to the middle of the cylinder, or rather to the plunger within the cylinder. Instead of the plunger moving, this arrangement had also the additional advantage of being reversible, so that either end could be used for anterior and posterior cavities. Up to this point the instruments are, in a measure, known to you, having been for sale in the depots. It being evidently a desirable feature in an instrument of this character that it should combine the duties of a packer as well as that of a carrier, I would this evening bring to your notice a successful attempt I have made to accomplish this. In these instruments there are examples of three ways in which this desirable point may be accomplished. Steel-plugger amalgam-points, of any form desired, are made with the extreme lips recessed and counter-sunk, or drilled out and tubed; the edges of these tubes are serrated. When these instruments are used it is evident that the amalgam will fill up these tubes, recesses, and serrations. This being allowed to remain in position, becomes hard and permanently attached; but it still retains the power of attracting pieces of fresh amalgam, and will carry them successfully. Another form, suggested by Dr. Bonwill, of Philadelphia, is that of a file-cut surface; the idea is carried out more fully in these coarse serrations, which, either in their original form as serrations, or by the amalgam adhering thereto, answer the purpose. Still another form of the device is the use of points, made of metal, capable of being amalgamated. This idea, suggested by Dr. Peck, of Morristown, New Jersey, I carry out in the use of brass and silver points; of course, the more readily the metal is amalgamated, the better it will operate, and, although brass is useful, silver, I take it, is the best. Before leaving the subject, allow me to make a brief criticism in regard to the instruments of Dr. Miller, illustrated in the last COSMOS. The use of a spring in connection with a movable cylinder in that class of instruments referred to, and which may be called cylinder carriers, I early discarded as a detriment, as they destroyed a part of the usefulness of the device, *i.e.*, as a packer, which purpose it serves to a limited extent. Again, a straight form can be but little used; but few dentists in this country using amalgam in any but the posterior teeth.

Dr. Howe. I would like to ask if the instrument amalgamated in the way Dr. Elliott has described will pick up the amalgam if it is very dry, as we use, according to instructions, Fletcher's amalgam.

Dr. Elliott. As far as I can, I make the amalgam dry, in which case there is no difficulty; but I can imagine a case where, by reason of extreme dryness, it might be advisable to use the cylinder carrier.

A paper, entitled "The Oral Cavity,"* by Dr. Foster, of Boston, Mass., was then read by the secretary.

Dr. W. H. Dwinelle. I move a vote of thanks to Dr. Foster, for the very able paper that has been read before us this evening. Take it in all, it is a very able and commendable paper, and very interesting.

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* This paper will appear in the January (1878) number of the DENTAL COSMOS.

He has added new dignity and honor and grace to our field of operations.

The motion was adopted.

The following paper, entitled "The Safety Pocket," by Dr. J. W. Clowes, of New York, was then read:

The subject of devitalizing dental pulps is attracting much attention at this time.

The professional mind in our societies and journals seems aroused in unwonted degree to its discussion. The formula of Spooner, honored by time and use, was never more honored than now. It is verily a *large* thing, and, when rightly employed, *altogether and eminently beneficent.* But the *rub "is in the application of it."*

After many years of practical devitalization, our savans in every direction are uttering, by labored disquisition and lengthened essay, the most dolorous confessions of disaster. Conscious of evil wrought in the past, they are striving by deeper thought for larger knowledge; the attainment of which, in fullest measure, may well enlist the earnest desire of suffering humanity. The victims to arsenical misuse and abuse are all around us; where civilization extends they abide.

"Their numbers fill the land,
Their groanings fill,"

and gum and osseous tissue—fistulated and cavernous, necrosed and sloughing—are reeking with purulence and fetor! The enormity of these conditions is such that the professional conscience is at last awake and smarting under the conviction, not only of blundering, but of absolute sin, the progress of which the best hearts and strongest hands of the most advanced intelligence are solemnly invoked to obstruct and stay. Is there any one *here* guiltless of this thing? Believe it not. Are there individuals of this profession *anywhere* consciously innocent of this act? No one can claim exemption! We are all involved! We are all alike compromised, and equally all are needful of repentance! Let us then repent and sin no more. The object and purpose of this paper is to promote repentance by marking out a new course and showing a better way, and I trust the result aimed at may be equal to my desire.

Man, like a wagon, is perversely addicted to *ruts.* He has a proclivity for running into and limiting his actions, mentally and physically, by them. Once well *rutted*, the courses of his life are fixed, and nothing short of the moral throes of a convulsed mentality can possibly oust him! The *rut* dental, an important branch of the rut professional, I propose now to consider. Far back in the early history of our beneficent science, a man appeared,—a man of mark, of good social position, commanding person, and favored by circumstances,—a transit of the Atlantic, a visit to the old world, a crossing of palms with Sir Astley Cooper, an entrance to the medical academies of Paris, and a triumphal return. All these, and they were immense forces in those days, established this man's power and influence in his own profession and among the people. His word was law, and he its arbiter. Thus placed, thus elevated, thus confirmed, this man did, out of his presumption, his willfulness, and prejudice, construct a *rut* by denouncing and condemning a filling material that had in its composition more of salvation to human teeth than any other substance then or to this day known. Into the *rut* thus formed he blindly plunged, and ran and wallowed in its depths, and his abject followers ran and wallowed with him, and the members of other great professions humbled themselves, and ran and wallowed too, and the great public ran and sank to their very chins in the muddy mire of this portentous rut. In the history of our race there never was a more humiliating instance than this of the "blind following the blind," and its consequent results. But there came a time when increased intelligence and ripened intellect drew forth the imprisoned from this ignoble *rut*, established them in truth, and set them free. There came a time when the science we are all laboring to commend, the calling we are ambitious to elevate, received an impulse so vast and startling, that *the events of those three December days in this society* will be forever memorable and glorious.

Out from the mists and shadows that early encompassed this profession other *ruts* took course; some of them, maintained by habit and use, are in full force to-day. Of these, the *wedge rut* has run deepest and ruined most. The *remorseless rubber*, the *swelling wood*, the *driven wedge*, the *jack-screw*, offshoots of ignorance and relics of barbarism, must they still continue to do their wicked work? Can nothing enlighten the blindness of our conservatism? For what purpose, to what end, are these wedges applied? To make room between teeth, to acquire space for the operation of filling. Space having been gained, the filling accomplished, and wedge left out, what follows? The teeth come together again, again to decay, and nothing more. *Hence we discover why so many dentists are on the confessional in reference to the failures in their work.* One distinguished operator says, "In a vast number of cases filling does not meet the requirements. A great many approximal fillings must be done over many times," and straightway another from beyond the sea hastens to echo and adopt the sentiment. So it is coming to be admitted, too generally I fear, that dentistry does not afford a permanent salvation for human teeth. *All this is the outcome of ruttage, the perverse adherence to the miserable, unnatural, and inhuman practice of wedging.* The man who crossed palms with Sir

Astley used wedges. He had wedging on the brain, and kept wedges continually between his teeth. His followers are legion, and oh! how they do stick to the *rut* established by their great exemplar. *Separation* among teeth should not be a transient condition, resulting too often in irritation, inflammation, and devitalization. It should be permanent, fixed, abiding. In almost every human mouth kind nature shows us the wisdom and importance of separation. *Where two teeth are found naturally apart, they are almost invariably sound.* Where two teeth are found in contact, they are, as a rule, decayed, or in time will become so.

These are facts, facts patent to even a limited understanding, and yet the eyes of intelligent men are so blinded by the *ruttage* of example, habit, custom, that they can only peer out from the vast abyss and see nothing! *Where correct methods of action are adopted and practiced, dentistry will be found entirely reliable in the work of salvation.* Where methods are false and wrong, nothing but failure can ensue. Real dentistry needs no apologists. It is a positive science and its results are sure. I wish just here to emphasize more fully the arguments already employed by additional reference to correlative facts. It required more than twenty years of abuse, calumny, and persecution to bring amalgam so prominently to the front, that a moral upheaval finally sealed and confirmed its intrinsic value. It took years of labored effort and earnest exhortation to introduce rubber dam to favor, and I am fully mindful how hard it is to gain acceptance for a new idea or for any really good thing. My memory goes back to the time when removing enamel and bone from teeth sufficiently to allow the operation of filling was a *fearful* thing; when the pursuit, by *excision* of the flaws and crevices connected by decay, was possibly an unwarranted act; when an attack upon the center and extremes of the bicuspidal sulci was, maybe, *not just the thing.* As to the vandalism of separating two sound teeth by file or chisel, that was an act to be execrated of all men, and the very *thought* of its commission would almost conjure the evil one, pitchfork and all, into visible presence. The profundity of my then ignorance was the only real cause for worriment or concern. I confess to having fully outgrown these senseless qualms and doubts, and the compunctions, if any remain, are rather for omitted duties than committed sins.

"Oh," say the unregenerate, "do not touch the precious enamel and bone; it is wrong to remove them; they were placed there and they ought to stay." "Oh," say the foolish, "don't saw off the superfluous limbs and interlacing branches of my beautiful pear-tree; they all grew there, and you must not take them away." "Oh," say the verdant, "don't disturb the excessive growth of my mangel-wurzels;

they all sprouted where they are, and they ought to be permitted to vegetate in crowds." To all this, I say avaunt! Give us free course, give us light, give us expansion, and let stupidity cease!

Having said thus much regarding the danger of adhering too closely to lines already drawn and courses established, I ask you henceforth to cultivate a larger independence of thought and action. Neither condemn nor approve anything until you have fairly examined and tried it. Bondage to a *rut* is unmanly and disgraceful; but "running in grooves of righteousness and judgment" develops the noblest manhood and the highest skill. To be informed, to be self-contained, to move on planes regulated by law and held to place by unerring forces, is the highest liberty. To this I commend you!

You are doubtless wondering by this time where the "Safety-Pocket" comes in; I have purposely kept it back that I might first prepare your minds for its appropriate reception by a detail of events, experiences, and facts that go to make up an important part of our professional history. I have restrained my impatience to impart, while exhorting you patiently and fearlessly to *receive* not only this, but other truths herein declared, and which eventually must gather force and win their way. If our brother at Chillicothe will accept this "*pocket*" in *his* practice, the depressing malarias of his district may be set at naught by killing instead of capping nerves, and "accidents by arsenic" become unknown and obsolete; and he of Philadelphia, who so well sustains the Flagg of *our* profession, need no longer be under the necessity of expending so much of effort and anxiety over that troublesome "cavity of decay." He may entirely eschew it henceforth. Come up out of that *rut*, and leave "ligatures" untied and unused for evermore.

I am about to impart the knowledge of a little thing; but its size does not detract from its importance. All history bears witness to the value and power of the minute. Omnipotence was in the "still, small voice." "A great matter was kindled by the little fire." Development everywhere must have its beginning in a germ. I say it is a little thing; but to me its proportions are immense. As a barrier against pain, disease, and devastation, it is inestimable. Thus appreciating, I pass it over with pleasure to your favoring regard and kind reception. *The application of arsenic to a tooth with safety, requires, with few exceptions, a complete avoidance of the cavity of decay.* Make a *pocket* or retaining cavity for yourselves in a perfectly safe and convenient location, thought and judgment will best indicate where. Make it in and through, if necessary, the sound enamel and bone. Let it penetrate one-half or two-thirds in depth toward the pulp. Be fearless, and heroically cross over the Rubicon of hesitation and restraint! Let the pocket be small, but larger inside than at its orifice. Saturate a small pellet of cotton with creasote and arsenic—of creamy consistence—and deposit it at the bottom of the pocket. Apply other pellets of dry cotton over this one and pack them skillfully away. Leave morphia to the *rut*, you have no need of it. It is an obstructor. Allow the application to remain a week, more or less, in *the pocket* (intelligence directing), then remove the devitalized pulp; after which, slightly moisten the nerve-canals with chloride of zinc or creasote, and fill them with osteo-plastic, and the main cavity with some incorruptible and substantial material. If aptly done, you may, at this point, exchange congratulations with your patient, for you will have accomplished one of the most important and useful operations in dentistry. *The safety-pocket is the result of an immense effort to escape from the thraldom of custom and habit, as practiced in the past.* It is a permanent and rational reply to the question,—"Why stick to the cavity of decay" in applying arsenic to a nerve? Why run risks, incur danger, and do actual harm without the slightest necessity? This *pocket* is the blessed medium through which arsenic—long used, much-abused, yet beneficent arsenic—may accomplish its real and true mission among dental pulps. To the graybeard, to middle age, to infancy and youth, it is alike the fullness and assurance of safety.

Dr. B. Lord. Dr. Clowe's idea of the safety-pocket is not entirely new, as I have in a few cases adopted that plan, and found it to work exceedingly well, more particularly in the molar teeth. I have not tried it in the front teeth, as I do not think it could be adopted without weakening the crown or disfiguring the surface. When I make a hole for this purpose, I continue it until the nerve becomes sensitive or painful to the instrument. I consider this plan very much safer than to put the arsenic in the proximate cavity, when the decay has extended below the gum. In such cases I fill the approximal cavity with gutta-percha. I first saturate the cavity with the oil of cloves; then introduce the gutta-percha as warm as can be borne; it is softened by the oil of cloves, and can be inserted without much pressure. I have found the oil of cloves in working gutta-percha under such circumstances to be quite useful, and the effect is pleasant and happy. I should cover the arsenic with gutta-percha, of course, if it was to remain several days, and that would be necessary if the opening did not continue to the pulp. I should use carbolic acid instead of creasote. In some way it seems to be more penetrating, and, of course, there is no unpleasant odor.

Dr. W. H. Dwinelle. I don't know but I am unusually obtuse this evening. But I don't comprehend what this safety-pocket is, and I would like to inquire what it is? What necessity creates it?

Why is it any better than the old method of proceeding to destroy nerves? What constitutes it a safety-pocket over and above the old system?

Dr. B. Lord. As far as I am concerned, the safety consists in being able to apply the arsenic in a way that it is possible to use it and not produce inflammation of the gums or even worse effects.

Dr. W. H. Dwinelle. My system has been to apply my paste of arsenic, morphine, and creasote direct to the exposed nerve. If the nerve is not entirely exposed, and I yet feel justified in destroying it, I apply the paste to the thin wall above it; often, if practicable, I puncture through the wall and expose the nerve. With paper I thoroughly dry the bottom and walls of the cavity; then I apply a mere moiety of the paste, cover it with a little patch of paper, sometimes place a little piece of metal over it to protect the nerve from pressure, and then seal up with gutta-percha, which, if sufficiently soft, will readily cement to the walls of the cavity, and seal it hermetically, and there is nothing to apprehend. I never had any trouble. I could have lots of trouble if I was careless. What the safety-pocket is I don't know. I don't know the necessity of a safety-pocket.

Dr. J. W. Clowes. I have produced something that is of no account. There are not any gentlemen here who know what harm arsenic has done in the past. They don't know how whole jaws have been lost, and how a great many sad accidents have occurred from this same arsenic. They don't appear to know anything about it. They are innocent. I have seen a great deal of this myself. I suppose the members of the society don't know, and my friend who has just spoken don't know, what the safety-pocket is. In nine cases out of ten, arsenic placed in a cavity near the gum, whether it is buccal or proximal or lingual, will go to the gum, and from there to the process, and I don't know where it will stop. And yet, when I tell you to make an opening in the crown of the tooth at the point farthest from the gum, you don't see what there is safe about it. It is the strangest thing in the world.

Dr. O. E. Hill. Dr. Clowes says that in nine cases out of ten where arsenic is applied in approximal cavities, the decay extending beyond the margin of the gums, trouble ensues. That statement may be placed side by side with the one he made a year ago, that dentists did more harm than good to the teeth. It is simply ridiculous. I hardly believe that even in *his* practice, in nine such cases out of ten has he got into trouble. I don't believe he has had trouble in one case out of ten in applying arsenic. As a rule, when it becomes necessary to destroy a pulp, the principal object in doing it more than anything else, is to relieve the patient from pain at the moment; and if you must drill away several minutes to get a safety-pocket, the patient will suffer more in those two, three, five, or ten minutes, as the case may be, than is desirable. I have read Dr. Flagg's papers in the Dental Cosmos on that subject, but I cannot appreciate the danger if care be used. I am no more expert than others; and yet I have never had any trouble. The danger is in using too much of the material. I use arsenic and morphia moistened with creasote; wrap a very little of this in dry cotton, and then wiping out the cavity thoroughly, take a roll of bibulous paper, and crowd it down upon the gum solid, let it lie there, put in the preparation, and cover it with cotton and sandarac, leaving the paper there. By this method it is almost impossible to get the arsenic on the gum, and certainly the method is simple enough.

Dr. William H. Allen. I wish to protest against this wholesale denunciation of dentists. I have filled teeth for forty years, and in my practice I have never seen a case like that which Dr. Clowes describes. I don't know what *his* practice is. I should judge he knows how to operate properly; but when he comes here and says that in nine cases out of ten the use of arsenic causes diseased conditions of the gums and destroys the alveolar process, why, if I believe what he says, he is the biggest kind of a bungler, and don't deserve to be classed with the dentists around him. I am not conscious of such a case, and I say there is no necessity for such a case.

Dr. J. W. Clowes. I am talking about buccal cavities and proximate cavities. I say in those cases, as far as my judgment goes, as far as I have seen, there is more or less injury done; perhaps nine cases out of ten is rather an exaggeration; but I have seen a great many cases where damage has been done by arsenic applied in such cavities. I am speaking of what I see, and I am trying to tell you how to avoid the danger. I am happy that those who hear me have not had these distressed cases come under their notice; but I have seen it in the mouths of those who have been in the hands of first-class practitioners.

Dr. John B. Rich. I do not suppose that Dr. Clowes intends to accuse any of his hearers of using arsenic in so careless a manner as to produce the conditions he describes, and yet, for the purpose of discussing this paper intelligently, we ought to know who are the persons intended to be rebuked by his paper. Will he please inform us who they are, and also if these dreadful effects have followed his application of arsenic?

Dr. Clowes. It has not.

Dr. John B. Rich. I have used arsenic for devitalizing the pulps of teeth ever since the time when Dr. Spooner suggested its employment for that purpose, and in all the years that have intervened since that time I have not seen a single case where such results have been produced by its application as those described by Dr. Clowes. I believe that all those whom we are willing to regard as our professional brethren have such an appreciation of the responsibilities of their position that, when they find it necessary to use so dangerous a substance as arsenic about the mouth, they will use all the care and precaution possible that no untoward results follow its application. In cavities of the character more particularly described by Dr. Clowes, where the edge extends down to or below the gum, that part of the cavity so situated can be prepared and filled with any of the plastic substances generally used for temporary fillings before the arsenic is introduced, and that part of the filling so arranged that, when the arsenic is applied and the rest of the cavity closed up, no portion of this dangerous material can escape. This simple method of preventing accidents in the use of this substance does not require any but the most ordinary manipulatory skill.

Ordinarily, arsenic is employed as the most speedy means known for destroying the vitality of an exposed, inflamed pulp, and thereby relieving the patient from the existing pain. For the purpose of the immediate relief of pain, arsenic applied in Dr. Clowe's "Safety-Pocket" would not answer at all; it might be weeks before it would reach and act upon the pulp. It is not a new method of applying this material; I used it in that manner many years ago, and the first case, in which it was an experiment, I will now describe. The right inferior cuspid in the mouth of one of my adult patients was so situated as to produce a very unsightly deformity. To remedy this it was necessary to remove that tooth. But this was not so easily done, as the crown was completely surrounded on all but the front side by the adjoining teeth, so that it could not be grasped by an extracting instrument. In this dilemma, I concluded to cut off the crown by boring a line of holes close together through it, near the gum, from the front side, and then extract the root with the screw; these holes could not be bored until the pulp was devitalized, and, as the tooth was perfectly sound, I concluded to try and devitalize the pulp by introducing arsenic in the substance of the dentine; for that purpose, I bored a hole in the crown and placed a small portion of arsenic in it, and sealed it up with mastic cement. It was over three weeks before there was any evidence that the arsenic was acting upon the pulp; it finally destroyed it, and I was enabled to execute my plan for removing the crown and extracting the root. In regard to bad results following the use of arsenic in the mouth by dentists, I do not remember in the whole course of my professional life meeting with more than three or four cases where arsenic had been applied to the teeth in a careless manner. One of these occurred within the past twelve months, and was remarkable from the liberal manner in which this deadly substance was used. The patient, a lady, upon being attacked by toothache, had gone to the dentist who usually attended to her teeth. He was engaged with another patient whom he could not leave, so he placed her in the hands of one of his assistants, who examined her tooth, put something into it without informing her what it was, or giving her any directions in regard to it, dismissed her, with the remark that she had better call again in about a week. As the application he had made did not relieve her, she called upon me the next day, and when I removed the temporary filling the dentist had placed over the substance he had put in, I was surprised to find the whole of quite a large cavity filled with dry arsenic, with a little cotton placed over it. I removed from that cavity almost enough arsenic to half fill a lady's small thimble; fortunately for the patient, the cavity had been tightly closed. The examination of the tooth proved the incompetency of the dentist, for the toothache had not been caused by an inflamed pulp, as that organ had lost its vitality some time previous, was very far gone in decomposition, and in a semi-fluid condition. But I apprehend that cases like the one just described are not often met with, and never occur in the practice of reputable dentists, who, as far as my observation extends, use this dangerous material with all the care that is necessary, and it cannot be for them that the implied rebuke contained in Dr. Clowes's paper is intended. Now, who are the culprits, and are they of a class that we have anything in common with? I do not think that they are, nor is it our business to endeavor to find preventives against their misdeeds.

Dr. W. H. Dwinelle. I rise to indorse the remarks made by Drs. Rich and Allen. I have been in practice more than thirty-eight years, and have used arsenic constantly ever since my initiation into the profession. I don't think it is any boast,—it ought not to be boasting for a man who has his eyes and ears about him,—it is not boasting to say he has used arsenic all his lifetime and never met with such an accident as referred to by Dr. Clowes. I could have had trouble with every application I made of arsenic if I chose to; if I were careless in applying arsenic in a cavity, especially if its wall was broken down so that the borders of the gum were encroaching within the cavity, I could have any amount of trouble. Of course, every case does not present itself to us alike. I might say that no two cases present themselves to us alike. They all need different modifications. We don't make all our shoes on one last. There is a never-ending variety of cases requiring a continual invention with us from morning till night. We belong to the "noble army of inventors," and in our practice we illustrate the principle that "necessity is the mother of invention." We are constantly finding ourselves in corners from which we have to invent ourselves out. We could all be unsuccessful if we were not actuated by the highest principle, and by the greatest care and effort to attain to the highest perfection. For instance, I have had a regulating case within a week, wherein I desired to save a sixth-year molar. Its lingual wall was broken down, and I wished to save it for a purpose. The nerve was not only exposed, but had grown into a fungus that filled the entire cavity of the tooth, and, from the lingual wall being broken down, even below the gum, came in contact with the tongue itself. I destroyed the fungus mostly with caustic potash, and sealed up the cavity. The next day I cleaned it out, and built up such a wall as described by Dr. Rich, not of gutta-percha, but of osteo-plastic. I first put in a core of soft wax, in the central part of the tooth, covering the exposed nerve. I then built up the entire lingual wall with osteo-plastic. On softening and removing the wax, the nerve, in its fungoid form, was perceptible at the bottom of the well. I applied arsenic paste to this, and sealed it up with more osteo-plastic. Forty-eight hours afterwards I cut away this last portion of osteo-plastic, and removed the nerve from its canals. These I filled with gold, and afterwards completed the crown with osteo-plastic, as I wished to keep it for a year or two. Here was a case as extraordinary as any that can well be imagined, and I had no apprehension of any leakage or trouble. It is ridiculous to assume that trouble is necessary under such or any circumstances. If proper care and skill are used, such culpable and disgraceful results as Dr. Clowes refers to will never occur. I think our friend gets into a "*rut*" himself occasionally. He has had his rutting season to-night; very naturally they seem to come over him periodically. About a year ago he had an unfortunate attack, when he declared that dentists did more harm than good. I think he falls into a rut in this matter when he puts the stamp of dishonor on our calling by virtually declaring that our noble profession was a failure, and all of its members were impostors. It is time we should repudiate such infamous, if not traitorous, doctrine, and defend our dignified calling, unsurpassed in its blessings, its charities and usefulness, from all such attacks, whether they proceed from without or within our ranks. Dr. Clowes's method of reasoning is, in some respects, unfortunately, a very common one here amid our deliberations, and has much to do in retarding, rather than advancing, our progress as professional men. It is the everlasting arraying the negative against the positive; arraying failure against success; what has *not* been done against what has been done; the unskillful against the skillful; poor work against the best; a general array of negative testimony before you, to disprove and annihilate established facts, as though it were possible to tear down truth from her high position, to stultify progress, and to destroy our hopes of the future. To utter the whining cry of "*woe*" in our midst, to disparage and to discourage. All this should be rebuked and put down whenever and wherever it manifests itself among us in our representative capacity. We are the custodians of the honor of our profession, and should look with jealous eyes, and be actuated by earnest, honest, and determined hearts, to the greatest ultimatum of our sacred trust. Our friend must have been very unfortunate in his experience. I think I can speak for every one here, and say that his has been an isolated experience. It looks like the experience of the unskillful, the charlatan, and the quack, rather than that of even the average practitioner. I have seen cases where people have been poisoned by arsenic. I cannot persuade myself that Dr. Clowes is correct in stating that he meets with arsenic-poisoning in nine cases out of ten. It may be so in his practice, as intimated by Dr. Hill, or in the practice of the parties whose patients have fallen into his hands, but I do not believe it is true of any other respectable practitioner. He has made the statement that dentists are doing more harm than good. I think he ought to verify such statements with facts, and confer with other brethren on the subject before he makes such assertions, so damaging and disgraceful to us as a profession.

Dr. J. W. Clowes. I wish the gentleman would not keep repeating what I have denied several times, about "nine cases out of ten."

Dr. S. G. Perry. I can relate one case which occurred in my early practice in support of Dr. Clowes's position. It was a case where arsenic reached the gum.

Dr. Atkinson. How far did it go?

Dr. Perry. Only a little way.

Dr. Atkinson. Into the process?

Dr. Perry. Not at all. It only destroyed the surface of the gum. It was due entirely to carelessness. I recollect it distinctly, as it made a marked impression on my mind, and served as a warning. Such a case has never occurred in my practice since. Dr. Clowes goes over considerable ground to reach his "safety-pocket." He speaks of the great harm done by introducing wedges between the teeth, and classes the injury done by them by the side of that done by the use of arsenic. He even speaks of pulps being destroyed by wedging! I can only say that I have used wedges more or less for years, and I have yet to see the harm he speaks of. In the hands of a careful man I think the danger an imaginary one. As you may know, he rather treads on my corns when he makes such sweeping statements regarding failures on proximate surfaces. He speaks of such operations as foregone failures. So they will be if performed in a certain way. But if operations on these surfaces are performed as we now know they can be, failures will not be frequent. If he has not been in the habit of restoring teeth, and of restoring them well, then he is not a competent witness, and his testimony should not be taken when given against that method. His testimony should only be accepted when he describes failures that follow his own method, which, according to the paper, is that of cutting teeth apart. I think his paper should have been read thirty years ago. It is a step backward. It is not up to the demands of the dental profession of to-day. As to ruts, I must indorse Dr. Dwinelle's statement when he suggests that Dr. Clowes may be in a rut himself.

Dr. W. H. Atkinson. Out of either modesty or compassion, I don't know which, I had determined to say nothing; but when questions come up and make our ignorance so apparent, it is time to say a word in recognition of the lack of ability to recognize conditions that we assume to see. What shall we learn from such papers and from such discussions as these, and such reports of other men's work and our own work? What is the fact about arsenic? You all know I take a very easy way to get rid of all danger from it. I let it severely alone. I know of no case where it is justifiable in the hands of an intelligent man. I know men I love, that say they have used it for years and years. Take the history of Great Jones Street, New York, and take the history of Walnut Street, Philadelphia, and what does it teach us about arsenic being applied to the tissues of the human body,—to the pulp and sockets of the teeth? Dr. J. D. White published in the *Dental Newsletter*, that when he found one of those roots so hard to extract, the way he did was to sprinkle arsenic about the gums, to destroy the attachments of the root, so as to enable him to take it out easily. Are you able to recognize what the ravages of this hated agent are? Do you know it is self-limiting? Do you know that the change which is present has no relation at all to the quantity of arsenic as a poison? Does arsenic honey-comb the bone? Does not arsenic preserve the tissues in a state that they do not decompose? How do we prepare subjects to keep them sweet in warm weather? The suggestion is enough to you that are fit to teach young men. The man who is fit to teach needs nothing more than the suggestion to eschew the act,—the application of arsenic. I wish we could be sure of anything, and I wish that earnest, honest men could be large enough to not jump at conclusions falsely against their brethren, by yielding to the stories patients may tell about what they have suffered at the hands of other members of the profession, worthy or unworthy. Who has not suffered from them? I myself have; but I have had the instruction of after-results, and I am glad of it, just as I am that I have been in any hell that has taught me the way to heaven. I can tell you I have taken out parts of processes, of the hard, dense part, and not only so, but of the cancellous portion, and never lost a tooth. I have been able to save the tooth, and it is all "bosh" to say that arsenic will extend beyond the space where it is brought in contact. I know of a man who used to fill the cavity with the white arsenic, and very carefully cover it, and tell the patient to go. That was Martin Luther Wright, of Cleveland, Ohio. What I say I know is true. I have seen teeth saturated with arsenic that have been preserved without necrosis; and we had better be certain of what we say, we had better have a thorough understanding of what takes place, and know more of the laws of nutrition, before freely using so active an agent. Now, I love you every one, and Dr. Clowes not the least do I bear affection to. I have talked with him long and earnestly. If he had followed the lead that was open to him, he would not make the exhibit he has made to-night. I am not one of those persons who have not soul-scars. I am chock-full, as a professional man, of scar-tissue. I have grown up through it, and that is the reason why I wished to say what I have had forced out of me to-night, for I wish to think you are intelligent, lovers of the right, doers of the right, redeemers of the tissues and organs of the human body from the infraction of law. It is a lack of knowledge of pathology and physiology that makes Dr. Clowes say "dentists are doing more harm than good." Mankind is not silly. Dentistry could not be where it is to-day if that were true. You will see that the whole community will soon discriminate between those who serve them well and those who do not. I don't say that any of us are free from error. I rejoice in what has been said that these men have not seen these things. I can believe these men. I was kicked up from under an obscure cabbage-leaf, and when I obtained the book of Spooner I knew no better than to follow it. My blessed mother taught me when I was wrong to wheel about the other way, and I did it quick. If you had heard the warning of my voice that welled up with affection for you, all of you would have turned out the arsenic from your offices. I pleaded with Dr. J. W. White not to put arsenic in the "Materia Medica." He said, "the profession demands it." If the profession demand to be damned, will you damn every one of them? "The profession demands it!" All the iniquities of the world come into the world the same way. They have said let us get the money, and if we can bless some one after we have got the money, that is all right. But money should not be the first thing. That is what makes men go blundering all the time; and I hope the boys will not listen to any such thing.

Dr. W. H. Dwinelle. It was my pleasure to deliver the annual oration before the American Academy of Dental Science, in Boston, last September, and, as one of the usual incidents, we had an entertainment at the Parker House. As on occasions of that character, the toast went round. Among others, the president gave the following sentiment: "The American Academy of Dental Science, to its friend, the Odontological Society of New York: may their intimacy be cemented by mutual intercourse." It was expected that our host, Dr. Francis, would be present to respond. Unfortunately, neither Dr. Francis, nor our worthy president, nor any one else from the Odontological Society was there; so I was called upon to respond, and I endeavored to do so, as well as my ability would permit. I remarked that I was not a member of the society, but still I had its interests deeply at heart, and it was an association I had the greatest respect for. In responding to the sentiment, I took occasion to refer to the benefits resulting from associations,—combined efforts in unity of purpose for good, referring to the fable of the bundle of rods; to the motto that in union there is strength; referring to that peculiar quality in human nature, that when men become isolated they become jealous, distrustful, and suspicious of each other, and being separated they become comparative enemies, and thus progress was crippled in its efforts; but that, when they came together, they found their own natures reflected in each, and realized the fact that "God had indeed made of one blood all nations of men to dwell together on the face of the earth." I referred to the Odontological Society, to the American Dental Association and Convention, as illustrious and illustrative examples of the benefits of association. You can imagine the many things I would naturally say upon such an occasion, and I am happy to be the bearer of this kind sentiment from the academy to you.

Adjourned.

CONNECTICUT VALLEY DENTAL SOCIETY.

The fourteenth annual meeting of this society was held at the Haynes House, Springfield, Mass., October 23d and 24th.

The following papers were read and discussed: "The Laboratory," by Dr. P. H. Derby, of Springfield; "Caries and Necrosis of the Maxilla," by Wm. Lester, M.D., of South Hadley; "Prevention of Cruelty to Patients," by Dr. J. F. Adams, of Worcester; "Status of Dentistry in Europe," by Dr. W. H. Jones, of Northampton; "Theory and Practice," by Dr. F. Searle, of Springfield; "Nutrition," by Prof. L. D. Shepard, of Boston; and "Reminiscences of Mechanical Dentistry during a period of Thirty-two Years," by Dr. J. Beals, of Greenfield.

The following were elected officers for the ensuing year:

President.—Dr. L. C. Taylor, of Hartford, Conn.

Vice-Presidents.—Drs. J. H. Smith, of New Haven, and C. S. Hurlbut, of Springfield.

Secretary.—Dr. C. T. Stockwell, of Springfield.

Assistant Secretary.—Dr. D. H. Smith, of Holyoke.

Treasurer.—Dr. N. Morgan, of Springfield.

Executive Committee.—Drs. Geo. L. Parmele, of Hartford, H. M. Miller, of Westfield, and Lester Noble, of Springfield.

C. T. Stockwell, *Secretary.*

OHIO STATE DENTAL SOCIETY.

The twelfth annual meeting of the Ohio State Dental Society will be held at Columbus, Ohio, in the State-house, Wednesday, December 5th, 1877, commencing at ten o'clock A.M., and continuing its session three days.

A. F. Emminger,
Corresponding Secretary.

A CARD.

The undersigned, with a view to the organization of a society of oral surgeons, the object of which is to be the cultivation of the science and practice of oral surgery as a specialty in medicine, respectfully invite correspondence from professional gentlemen who may desire to associate in the work.

As the attainments necessary to fitness for the practice of such a specialty belong to medicine and dentistry, the invitation is to those possessed of both qualifications.

A meeting is proposed in New York, notice of which will appear in a circular letter, after responses to this card are received and considered.

Letters to be addressed to either of the undersigned.

Wm. H. Atkinson, M.D., D.D.S.,
41 E. Ninth Street, New York.

James E. Garretson, M.D., D.D.S.,
1537 Chestnut Street, Phila.

EDITORIAL.

INDEPENDENT JOURNALISM.

Independent is a good word. Its historic associations make it impressive, especially to American ears. It looks well too in type, and is considered an almost indispensable word in the announcement of journalistic enterprises. Just what it is meant to express, as frequently employed, it is not always easy to determine; but, as already observed, it is a good word anyhow. And because it is so good it does seem that no one ought to expect or desire to enjoy the monoply of it. The right to it seems clearly to rank with those other inalienable rights with which all men are said to be endowed by their Creator. We do not object to the use of it by others, but we respectfully protest against being excluded from the ranks of the independents.

Before us are two new dental journals. We quote from their salutatories:

> "Heretofore efforts at independent journalism have failed to be self-sustaining, and for that reason our periodical literature is now dependent upon manufacturers and dealers for its maintenance."

> "One thing ought to be borne in mind, we have many excellent dental journals on this continent, but this humble . . . . enterprise is the only one not conducted in the interest of a college or a depot. . . . It [this] is an independent organ."

If this language means anything, it means that until the advent of these there existed no independent dental journals.

Webster defines independence to be "an exemption from undue influence; freedom from the control of others." But according to the language quoted, the trouble heretofore has been that dental periodical literature could not, in the nature of things, be independent, because published by manufacturers or merchants. The query naturally arises why a journal should be more independent if published by a dentist than by a dealer or manufacturer. Inferentially the latter are assumed to be subject to undue influence; to the control of others. Inferentially an individual, a firm, or an organization, interested in the supply of materials or appliances needed by the profession, or in the education of those desiring to enter its ranks, cannot be independent. If the charge is merited, it should be substantiated. If not susceptible of proof, its authors are simply pandering, and the language quoted is nothing but a fling,—an unworthy fling,—unless supported.

We point with pride to the nineteen volumes of the DENTAL COSMOS which this number completes, and defy the proof of influence or control. Its pages have always been open for the discussion of all questions of scientific or educational interest to the profession when presented in form suitable for publication. On the other hand, we point with equal satisfaction to the absence from its pages of the unseemly puffs of special manufactures, with which the pages of other and so-called independent journals are embellished. We have not, as those familiar with the DENTAL COSMOS are aware, allowed its pages to be prostituted to encomiums or testimonials of its publisher's manufactures nor of those of any other manufacturer or dealer.

The second number of the *Canada Journal of Dental Science*, one of the journals alluded to above, takes the other, the *St. Louis Dental*

Quarterly, to task for its assumption of independence, and challenges its title in the following words: "We venture to think our friends claim too much when they claim it to be an *Independent* periodical. From a good deal in it we should judge it intended to represent the Western College of Dental Surgeons, of which the senior editor is the worthy dean and the junior as worthy a professor. We claim this journal to be the only *independent* dental journal on this continent."

The *Canada Journal*, in the same number which contains the last-quoted reaffirmation of its independence, illustrates its "exemption from undue influence" by the following editorial paragraph, entitled "Our Advertisers:"

"We wish to direct attention to the gentlemen who have favored us with advertisements. It is only fair reciprocity to ask our subscribers to give them the preference of their patronage." . . .

Leaving these two claimants to special independence to settle their relative freedom from control, we are willing to submit the question, if puffs like those quoted may not be the result of influence; are not inserted in compliment to advertisers; may not be paid for directly or indirectly; and if a journal is to be assumed to be free from bias or from influence because its publisher is a dentist, any more than one published by a manufacturer is to be condemned on that account. A tree is to be judged by its fruits.

The advertising pages of any journal, let it be remembered, belong to the publisher. The subscriber is not charged for them. The editor is not responsible for their contents. They form a department separate and distinct altogether,—the exclusive dominion of the publisher.

It is true that "heretofore various efforts at independent journalism have failed;" but the reason has been that they did not so commend themselves to the profession as to secure a remunerative subscription list. Other like efforts will likewise fail, no matter how independent they may claim to be, unless they can secure a support which will put the balance on the right side of the ledger. But there is always plenty of room at the top.

DENTISTRY AS A SPECIALTY OF MEDICINE.

Even though the majority of those now practicing dentistry should be content to find their boundary within the limits heretofore accepted, and even though the majority of those now practicing general medicine should be content to remain as ignorant of oral lesions as is the average physician, there should be no objection on the part of either to an effort by others to acquire through special concentration, a special proficiency in the diagnosis and treatment of all abnormal conditions of the mouth.

Specialism is the inevitable outcome of the extension of medical art and science. It is acknowledged on all hands that it is utterly impossible that any one man can master medical and surgical practice in all its details, and the wonderful advances which have been made in aural and ophthalmic surgery, and by specialists in other branches of medicine and surgery, have simply compelled both popular and professional recognition.

The variety and importance of dental lesions demand a special and thorough preparation, special opportunities, and special practice, in order that the highest results in their treatment may be secured. With these convictions, we take great pleasure in calling the attention of doctors and dentists to the "card" on another page of this journal, and commend the invitation therein contained to their thoughtful consideration.

As will be seen by reference to the card, its authors recognize that a hiatus exists between the qualifications of dentists on the one hand and physicians on the other,—the result of partial training on either side. It is true that the institutions which have given the respective qualifications have equally failed to bridge this chasm. The doctor has graduated, knowing nothing of the lesions of the mouth, while the dentist has not been sufficiently educated, medically and surgically, to qualify him for practice as a medical or surgical specialist. Until the fact of this missing span is fully recognized, the community will fail to receive the benefit from either class which it is desirable it should secure.

We venture, however, to intimate that an organization such as the card invites must expect to be estimated for no more than its real worth. As oral specialists, its members will command respect only by special qualifications. If they take rank with ophthalmologists, dermatologists, gynecologists, and aurists, or any other recognized specialists, it can only be because of professional recognition not only of the necessity for such specialty, but by reason of the conviction that its fellows have *earned* the title of oral surgeons.

WESTERN COLLEGE OF DENTAL SURGEONS.

The announcement of this new institution was mislaid until too late for notice in the November number.

Premising that the college is located at St. Louis, and that Dr. C. W. Spalding is the dean, we submit the statement of the faculty as to the basis upon which it is organized:

The incorporators of this college have organized it for the purpose of taking a step forward in the cause of dental education. It is founded on the principle that no one knows as well as the practicing dentist the kind of instruction a dental pupil needs at the outset of his career. Therefore, its instructors are gentlemen in the daily practice of dentistry as an occupation. The incorporators believe that the true way to promote the cause of dental education is to raise the standard of acquirements requisite for graduation. Furthermore, they believe that whenever any one has fulfilled these requirements he is entitled to receive the evidence thereof at the hands of the college at which he presents himself for examination, provided he has complied with the rules and regulations of that institution.

They further believe that a compliance with mere arbitrary rules is not the best guarantee of the fitness of a candidate to receive a degree. On the other hand, they hold that one who by his industry and perseverance has qualified himself to pass a searching and satisfactory examination, without the aid of schools, is entitled to take rank in any profession, equally with those who, more favored by circumstances, have been able to avail themselves of the important, and to many the necessary, aids which the schools afford. No one should be allowed to graduate on superficial knowledge. The applicant must have *earned* his degree, and his title to it should be tested by a full and exhaustive examination in *all* the branches of knowledge with which a dental surgeon should be familiar, for the successful practice of his profession and for the maintenance of an honorable position as a professional gentleman.

AN OVERSIGHT.

It must have been through inadvertence that the author of the article on "Regulating Teeth," which appeared in the first number of the *St. Louis Dental Quarterly*, failed to give due credit to Dr. J. N. Farrar, and to the DENTAL COSMOS for January, 1876. Those interested may refer.

BIBLIOGRAPHICAL.

TRANSACTIONS OF THE INTERNATIONAL MEDICAL CONGRESS OF PHILADELPHIA, 1876. EDITED FOR THE CONGRESS BY JOHN ASHHURST, JR., A.M., M.D. Philadelphia, 1877.

This magnificent volume of eleven hundred and fifty pages contains all the addresses delivered before the Congress; the papers read in the meetings of the several sections, and abstracts of the discussions which ensued; eleven addresses before the Congress in its general sessions, nine papers read before the section on medicine, five before the section on biology, twelve before the section on surgery, nine before the section on dermatology and syphilography, twelve before the section on obstetrics, six before the section on ophthalmology, eight before the section on otology, five before the section on sanitary science, and four before the section on mental diseases.

These addresses, papers, and discussions, exhaustive as many of them are of their special topics, present in a single volume a grand *résumé* of the status of medical science and art, a cyclopædia of medicine and surgery. The labor of editing such a volume must have been immense, and for the evident painstaking, conscientious manner in which it has been performed Dr. Ashhurst deserves, and will doubtless receive, the thanks of the medical profession. We know not how better to express our appreciation of the work accomplished by him than to say that the volume before us entitles him to the rank of model editor. Dr. Ashhurst has given fresh significance to the old saw, that whatever is worth doing at all is worth doing well.

PERSONAL APPEARANCE AND THE CULTURE OF BEAUTY, WITH HINTS AS TO CHARACTER. By T. S. SOZINSKEY, M.D., Ph.D. Philadelphia: Allen, Lane & Scott, 1877.

This volume is devoted to a consideration of personal beauty; in what it consists; how it may be developed by culture; how special defects of the person may be more or less overcome or obliterated. It discusses height, weight, corpulence, leanness, sleep, food, dress, habits, and exercise in their relations to health, and consequently to beauty. Special chapters treat of the complexion, hair, lips, nose, eyes, breath, teeth, etc.

With some exceptions the volume may be commended as giving valuable hints regarding the culture of good looks in man and woman; the correction of morbid tendencies, hereditary or acquired, and how to make the best out of one's advantages and to hide defects.

The exceptions alluded to are directions and formulæ for popular use; such, for instance, as a prescription containing extract of nux vomica, to be taken for the purpose of correcting the action of the skin and improving the complexion.

The chapter upon the teeth gives some sensible and much ignorant advice. It condemns the toothpick in all its forms; recommends tincture of myrrh in water as a mouth-wash for general use; an alum-wash for a spongy condition of the gums; asserts that a wash made of permanganate of potash will remove tartar and other accumulations in a very acceptable manner, and commends as the least objectionable tooth-powder one made by pulverizing any aromatic bark or several together; prescribes for toothache arising from an irritated condition of the parts around the tooth or of the tooth itself the application of anything warm, such as hot water, or oil of cloves, or the tincture of myrrh; whereas, if it is intermitting, neuralgic in character, the cause being exposure of the nerve of the tooth, certain relief is promised from the application of creasote. How it is to be applied we are not informed.

The author cannot imagine why some people like to see their teeth stuffed with gold, and advises, if a filling is necessary, to have it done with something less noticeable, such as oxychloride of zinc, which he considers, under most circumstances, as good as gold,—a broader claim, we think, than has heretofore been made for it.

CANADA JOURNAL OF DENTAL SCIENCE.

This journal, after a dormant period of about six years, again makes its appearance as a quarterly of thirty-two pages, at $1.00 per year. The volume begins with August. Its publisher and editor is W. George Beers, L.D.S.

It is claimed that the profession in Canada feel the want of a home periodical. We hope this want will be supplied in the *Canada Journal*, and that it will meet with cordial encouragement.

THE ST. LOUIS DENTAL QUARTERLY.

No. 1 of the above enterprise is before us, a neat journal of forty pages, edited by Drs. C. W. Spalding and Henry S. Chase. The volume begins with October. Terms of subscription, $1.00 per year. It is issued "in the hope that a low-priced journal can be sustained by the legitimate patronage which it will attract." We wish it all the success its projectors anticipate.

WHAT ANÆSTHETIC SHALL WE USE? By JULIAN J. CHISOLM, M.D., Professor of Eye and Ear Diseases, University of Maryland, and Surgeon in charge of the Baltimore Eye and Ear Institute.

This is a paper read before the Baltimore Academy of Medicine,—a discussion of the relative merits of ether and chloroform as anæsthetics; modes of administration, causes of danger, etc. The author gives a decided preference to chloroform over ether in the following terms:

> *Believing, as I do, that both ether and chloroform can kill, when carelessly, indifferently, or excessively administered*—believing also that either of them will kill when the idiosyncrasy is met with, in which its usual benign effects become toxic, and that these two remedies will do so in equal ratio to the number of times in which they are inhaled, I naturally confide in the one which experience has taught me to be equally safe, more agreeable, less nauseating, and more efficient.

OBITUARY.

DR. LOUIS ALEXANDRE BILLARD.

DIED at St. Remy les Chevreuse, France, October 13th, 1877, Dr. Louis Alexandre Billard, in the seventy-ninth year of his age. Dr. Billard was widely and favorably known in former years as a manufacturer of porcelain teeth; later as a dealer in dental goods. He was a courteous and honorable gentleman, and possessed the confidence of the dental profession in France.

PUBLISHER'S NOTICE.

CLOSE OF THE VOLUME.

THIS number completes the nineteenth volume of the DENTAL COSMOS. A steadily-increasing subscription list has swollen its circulation beyond that of any previous volume, and, we are very confident, far beyond that of any other dental journal in this or any other country. A subscriber to it is to be found in every quarter of the globe where there is an English-speaking dentist.

This result has been reached only by persistent effort to excel; by the determination to make the DENTAL COSMOS the leading dental journal of the world, because of the most efficient service. How far we have succeeded, our unequaled circulation bears witness, and we commence the twentieth volume, beginning with January, 1878, in the confident assurance that the subscriptions will be still further increased. We have invited high expectations in the past, and we point with laudable satisfaction to their fulfillment. The DENTAL COSMOS has tried to deserve its title; has tried to cover the dentist's world of science and practice. We shall spare no pains in the further effort to make it supply the needs of dental practitioners; but its probable value in the future may be fairly estimated by its past record.

As hitherto, the DENTAL COSMOS is pledged to the dental profession to do whatever a journal may for that profession's advancement in usefulness, self-respect, and public regard, and for strengthening fraternal courtesy, justice, and co-operation among the men who have the destiny and responsibility of the profession in their hands.

The coming volume will remain under the editorial management of Dr. J. W. White. We ask for prompt renewals and subscriptions, that we may determine the size of the edition.

SAMUEL S. WHITE.

HINTS AND QUERIES.

"He that questioneth much shall learn much."—Bacon.

Correspondents desiring a reply in this department are requested to make use of *distinctive signatures or initials*, and avoid the practice of signing their communications Reader, Subscriber, etc.

Correspondents who wish notice to be taken of their communications should authenticate them with their names. We cannot insert queries or replies except they are so accompanied. Names not necessarily for publication.

The operators for the clinic of the First District Society, to be held at White's Depot, corner Broadway and Ninth Street, on the afternoon of the first Tuesday in December, are: Dr. Wm. H. Atkinson, of New York; Dr. E. G. Roy, of New York; Dr. Geo. A. Mills, of Brooklyn; Dr. C. Fones, of Bridgeport; Dr. Jas. G. Palmer, of New Brunswick.

The January clinic will be held on the second Tuesday, the first being New Year's day. Subsequent clinics on the first Tuesday.

C. E. Latimer,
J. M. Howe,
W. St. George Elliott,
Committee.

Why is it that, even though my flask be *perfectly* closed, in moulding celluloid plates I find the *teeth too long?*

I find the celluloid that has pressed out over the space between the body of the plate and the trench made for the surplus celluloid to stop in, at least equal in thickness to six ply of letter paper. Why is this, when the flask was completely closed in pressing up the plate? I make my trench about equal distance between the teeth and the edge of the flask, and do not cut any vents leading out to it. Perhaps the trench is too far from the teeth (?); if not, the only way I can account for it is, the plaster gives way. I use the Heindsmann heater, and soak the flask and plaster in water a short time before moulding, pressing up gradually from 230° to 280° or 300°.—Henry C. Stone.

Answer to A. W., in November Dental Cosmos —The discoloration of gold fillings is probably due to the presence of steel or iron from the plugger points or other instruments, impacted in the filling, dissolved by the surrounding fluids, and deposited on the surface of the gold.

Reasons for supposing so:

It is comparatively rare; occurs with all kinds and makes of foil; is superficial,—readily polishes up, but invariably returns in a short time; is local, affecting some fillings, while others in the same mouth, or even the same tooth, inserted at the same time, with gold from the same book, may be entirely free; more apt to occur where the gold is used cohesively than in cylinders or tapes, because of the more extended manipulation.

A somewhat similar discoloration is noticed when gold or silver with a piece of iron attached is thrown into "pickle." The color in the mouth is modified probably by the presence of organic matter.

The remedy.—Remove the surplus of the filling, and refill. It does not seem to impair the usefulness of the filling.—W. H. T.

Reply to A. W.— If A. W. will consolidate his filling well, polish it properly, and impress upon his patient the importance of keeping the teeth clean, there is little danger of a filling changing color.—J. L. F.

Reply to W.—I would say the first and most important precaution to prevent discolored joints is to fit them nicely together, then, if necessary to use anything between the joints, use os-artificiel, which is better than plaster.—J. L. F.

In reply to I. M. W., November number of Dental Cosmos, would say that the reason he had no "celluloid left to tell the tale" was, that the *heat* (320° necessary to vulcanize rubber) was too great for that required in working celluloid, 212°, consequently it was consumed, leaving the rubber all right.

The above will explain why rubber can be mended with celluloid, also why celluloid cannot be mended with rubber.—S. B. C.

I. M. W. asks why celluloid plates cannot be mended with rubber. Celluloid *burns up* at 300° F., while rubber requires 310° to 320° F. to vulcanize. If he will get rubber that will vulcanize below 290° F., he can succeed with his experiment. But the *best* way is to use *only celluloid*. There is no *chemical* difficulty. —W. B. S.

Reply to S. B. Cooke.—Prepared chalk, applied on retiring and allowed to remain all night, or the frequent application of sodium bicarbonate, will often give relief if persistently used for several weeks. Where that fails, caustic (silver nitrate) may be used, remembering that it sometimes, though rarely, darkens the tooth.—W. H. T.

Answer to Dens. Weight them Down.—Mr. Editor: I have watched with interest the answers to Dens in the last two numbers of the Dental Cosmos, but none seem to cover my mode used for lower jaws, with little or no alveolar border. One says gold. *So say I;* but it is not everybody that can pay gold prices. Others say Weston's metal. I say pure block-tin in preference; I think it tougher, hence stronger; but I use rubber weighted down. For a long while I used shot, sizes according to circumstances, but they would crop out sometimes and be unsightly. Now I use block-tin, cast into thin bars or thick wires, a mould made at the tin-shop, round a thick wire; the mould should be made of sheet-iron (tin would stick to the block-tin); oil it, pour in your tin, then you have it in a convenient shape to hammer out to the desired thickness and shape. Absence of alveolar border gives plenty of room for quite a weight of this metal to be imbedded in the rubber, which gives all the advantage of weight even with a rubber base. —E. Blackshaw, *Urbana, Ill.*

Reply to E. T.—E. T. should always put in plenty of rubber, and never remove the plate from the flask until it is *cool*. If he will observe these two points, with perfect cleanliness, he will never complain of "loose teeth," or "space between the teeth and plate, after it is vulcanized."—J. L. F.

In the Dental Cosmos for November I observed several answers to queries to which I feel moved to add a few thoughts. A "good fit" is the result of a perfect impression (full, smooth, air-tight), the perfect closure of the flask, and keeping the rubber under pressure until entirely cold. The plaster must be fine; must be mixed so that no air-bubbles remain, and must be hard setting, and allowed to be from five to ten hours in the flask before vulcanizing. The plate must be of uniform thickness, well vulcanized, and allowed to cool slowly and entirely before the flask is opened. The waste-chamber should be cut entirely around the plate, and separated from it by about one-eighth of an inch, so as to keep the rubber under pressure. To avoid thickness of rubber about the pins in partial sets, select teeth adapted in thickness of gum and tooth and length of bite. Maimed or broken models, dark joints, and cracked gums may be avoided by elevating the front of the model in the flask; measuring the rubber; grinding joints close before and open behind, which may subsequently be filled with oxychloride of zinc. Mix the plaster thick, free of bubbles, and run carefully.

S. R. D. may take the very best impression, make the truest model and the most perfect plate with the teeth properly set, and yet with little or no ridge he can never make a plate of rubber that will keep its place as well as one of Weston's metal. Its superiority consists in its weight; and it is less irritating to the tissues than a rubber plate. I know whereof I speak.—A. G. B., *Emlenton, Pa.*

ALTHOUGH I am practicing in a small place "away out in Minnesota," I trust you will permit me, through your journal, to take issue with Dr. F. F. Drew, of Baltimore. He says, on page 613, November DENTAL COSMOS, in regard to inserting lower plates when little or no ridge exists, "*Use Weston's metal, the idea being to procure a material sufficiently heavy to rest firmly upon the jaw and resist the action of the muscles of mastication.*"

I am surprised that *any one* should think of any metal being heavy enough for that, and much more so, that it comes from a gentleman possessing the *knowledge* that Dr. Drew undoubtedly does. I think that dogma is one of the most absurd doctrines that has, of late years, found credit in the dental profession. I think when the doctor reconsiders the matter he will agree with me that there is no material used for dental plates that is so *light* that it will not be readily and easily adapted to use, providing it is a *good fit*, and properly made. On the other hand, there is *no* metal *heavy* enough to keep an artificial denture in its place if it is *improperly* made, and does not *fit*. Why not, then, advise greater care to get a *perfect fit*, rather than try to overcome bungling work by heavy metal?—W. B. STEERE, M.D., *Dodge Center, Minnesota.*

ON DEMONSTRATING THE NERVES IN THE PROCESSES OF THE ODONTOBLASTS.—Sigma begs to apologize to Dr. J. S. Latimer and others, for not noticing previously their request in the August No. of DENTAL COSMOS, as that number was not carefully read, owing to the absence of Sigma in the country, and the request was not seen until kindly referred to by the editor.

The words "simple and easy" were used designedly, not that this demonstration is at all "elementary," but that it can be shown with much more success than many other undoubted facts in histology. It requires a good manipulator, first-class high-power lenses, and *patience* only.

First method, by Beale.—Carefully crush a fresh tooth (hammer or vise), then stain by Beale's method ("How to Work with the Microscope," 4th edition, Lindsay & Blakiston, 1870, p. 109); then macerate in Beale's strong syrup (p. 297), and after the tooth is somewhat softened, try a few very thin sections, when the acid will be found to render all tissues transparent except the nerves, which are granular.

Another method is *picric acid*, after Kleinenberg's formula:

℞.—Cold saturated aqueous sol. of picric acid, 100 cc.;
Strong sulphuric acid, 2 cc.;

M. and filter, then add,

Distilled water, 300 cc.

Soften tooth, make thin sections, and stain, secundum artem.

Third method:

℞.—Chromic acid, 10 grams;
Distilled water, 1 litre;

M. and add,

Nitric acid, 1 cc.

Soften and stain as above.—SIGMA.